



# ecology and environment, inc.

160 SPEAR STREET, SAN FRANCISCO, CALIFORNIA 94105, TEL. 415/777-2811

International Specialists in the Environment

## MEMORANDUM

TO: Rachel Loftin, EPA Region IX  
FROM: Patty Cook, Ecology and Environment, Inc.  
DATE: December 11, 1992  
SUBJECT: Completed Work, Work Assignment No. 20-18-9J00  
CC: Lisa Nelson, Work Assignment Manager, H-8-1  
Wenona Garside, EPA Contract Officer, P-7-2  
Travis Cain, EPA Project Officer, H-8-2

ATA -  
Pls. delete  
duplicate  
entry  
of Molycorp  
# CAD 009539321.  
for

Attached is the following completed:

PA \_\_\_\_\_ SI \_\_\_\_\_ EPI PA X PA Review \_\_\_\_\_ SI Review \_\_\_\_\_  
NPL Prioritization \_\_\_\_\_ SWIFT PA \_\_\_\_\_ SWIFT SI \_\_\_\_\_  
Other \_\_\_\_\_

Site Name: Molycorp #1979

EPA ID #: ~~CAD009539321~~ CAD 980695795

City, County: Mountain Pass, San Bernadino

Latitude: 35°28'25" Longitude: 115°26'30"

State Recommendation:  
(for Reviews only)

### FOR EPA USE ONLY

CERCLIS Lead: ✓ / SI-4 / ✓ NFA / C399-E / 2-1-93

pmg/molycorp/cwm-trans

RLof



# ecology and environment, inc.

160 SPEAR STREET, SAN FRANCISCO, CALIFORNIA 94105, TEL. 415/777-2811

International Specialists in the Environment

## MEMORANDUM

TO: Rachel Loftin, EPA Region IX

FROM: Patty Cook, Ecology and Environment, Inc.

DATE: December 11, 1992

SUBJECT: Completed Work, Work Assignment No. 20-18-9J00

CC: Lisa Nelson, Work Assignment Manager, H-8-1  
Wenona Garside, EPA Contract Officer, P-7-2  
Travis Cain, EPA Project Officer, H-8-2

Attached is the following completed:

PA \_\_\_\_\_ SI \_\_\_\_\_ ~~EPT PA~~ PA Review \_\_\_\_\_ SI Review \_\_\_\_\_

NPL Prioritization \_\_\_\_\_ SWIFT PA \_\_\_\_\_ SWIFT SI \_\_\_\_\_

Other \_\_\_\_\_

Site Name: Molycorp Inc

EPA ID #: ~~CAD009539321~~

(1979)

CAD 980695795

City, County: Mountain Pass, San Bernadino

Latitude: 35°28'25"

Longitude: 115°26'30"

State Recommendation:  
(for Reviews only)

### FOR EPA USE ONLY

CERCLIS Lead:

SI-4 Complete | F lead | NFA

pmg/molycorp/cwm-trans

4/14/93 JMD

*[Signature]*

2.1.93

1378

4.14.93  
ATA -  
pls. correct  
site name.

FROM: MOLYCORP ...  
TO: MOLYCORP INC.  
and return this to  
CERCLA file. The,  
PL



# ecology and environment, inc.

160 SPEAR STREET, SAN FRANCISCO, CALIFORNIA 94105, TEL. 415/777-2811

International Specialists in the Environment

## MEMORANDUM

TO: Rachel Loftin, EPA Region IX

FROM: Patty Cook, Ecology and Environment, Inc.

DATE: December 11, 1992

SUBJECT: Completed Work, Work Assignment No. 20-18-9J00

CC: Lisa Nelson, Work Assignment Manager, H-8-1  
Wenona Garside, EPA Contract Officer, P-7-2  
Travis Cain, EPA Project Officer, H-8-2

Attached is the following completed:

PA \_\_\_\_\_ SI \_\_\_\_\_ EPI PA \_\_\_\_\_ PA Review \_\_\_\_\_ SI Review f

NPL Prioritization \_\_\_\_\_ SWIFT PA \_\_\_\_\_ SWIFT SI \_\_\_\_\_

Other \_\_\_\_\_

Site Name: Molycorp Inc

EPA ID #: ~~CAD009539321~~ CAD980695795

City, County: Mountain Pass, San Bernadino

Latitude: 35°28'25"

Longitude: 115°26'30"

State Recommendation:  
(for Reviews only)

---

### FOR EPA USE ONLY

CERCLIS Lead:

SI-4 Complete / F Lead / NFA

pmg/molycorp/cwm-trans

R. Loftin

2.1.93

ENVIRONMENTAL PRIORITIES INITIATIVE  
PRELIMINARY ASSESSMENT

Purpose: RCRA ~~Preliminary Assessment~~

Site: Molycorp  
67750 Bailey Road  
Mountain Pass, California  
San Bernardino

Site EPA ID Number:

CAL 930 695 795  
CAD009539321

Investigators:

Chris Lichens  
Paul Cort

Date of Inspection:

March 13, 1992

Report Prepared By:

Chris Lichens

Report Date:

December 11, 1992

Review/Concurrence:

Submitted To:

Rachel Loftin  
Site Assessment Manager  
EPA Region IX

1846  
D.A. [unclear]  
1846  
This is CERCLA  
SI-4 Document  
2/1/93? (see other  
version of  
SI-4)



**ecology and environment, inc.**

160 SPEAR STREET, SAN FRANCISCO, CALIFORNIA 94105, TEL. 415/777-2811

International Specialists in the Environment

recycled paper



## 1. INTRODUCTION

As part of its Environmental Priorities Initiative (EPI) program, the U.S. Environmental Protection Agency (EPA) has requested Ecology and Environment, Inc. (E & E) to conduct a Preliminary Assessment (PA) of Molycorp, Inc., located in Mountain Pass, California.

The EPI program integrates the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the 1984 Hazardous and Solid Waste Amendments (HSWA) with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), in order to set priorities for cleanup of the most environmentally significant sites first.

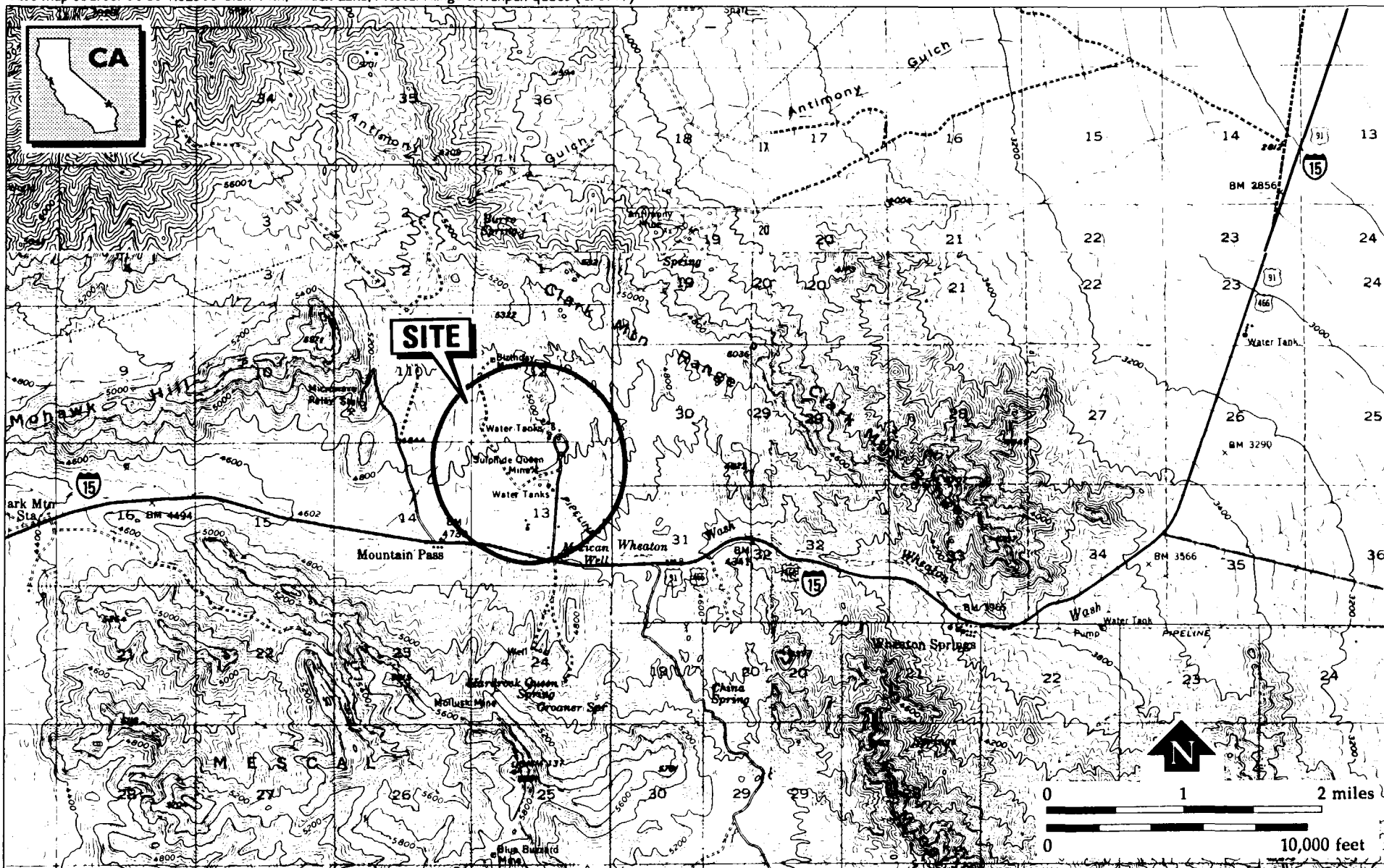
## 2. SITE DESCRIPTION

### 2.1 SITE LOCATION AND OWNER/OPERATOR HISTORY

The Molycorp, Inc. (Molycorp) site is located in the high desert area of Mountain Pass, California, in San Bernardino County (Township 15 North, Range 14 East, San Bernardino Base Line and Meridian, Latitude: 35°, 28', 25", Longitude: 115°, 26', 30") (1). The site is located approximately 60 miles southwest of Las Vegas, Nevada, 15 miles from the California-Nevada border in an area known as Mountain Pass (see Site Location Map, Figure 1). Mining of rare earth elements began at the Molycorp site in 1951. From 1951 to 1977, three small local mines produced lead, zinc, gold, copper and tungsten at the site. Molycorp, owned by Union Oil Co., has been mining rare earth elements on site since 1977. Mining of an intrusive igneous carbonatite mass at Mountain Pass furnishes the raw ore for the bulk of the world's supply of rare earth elements (2). The site consists of 9,000 acres of land that is both leased and owned by Molycorp. Molycorp currently has 200 full-time employees (3,4).

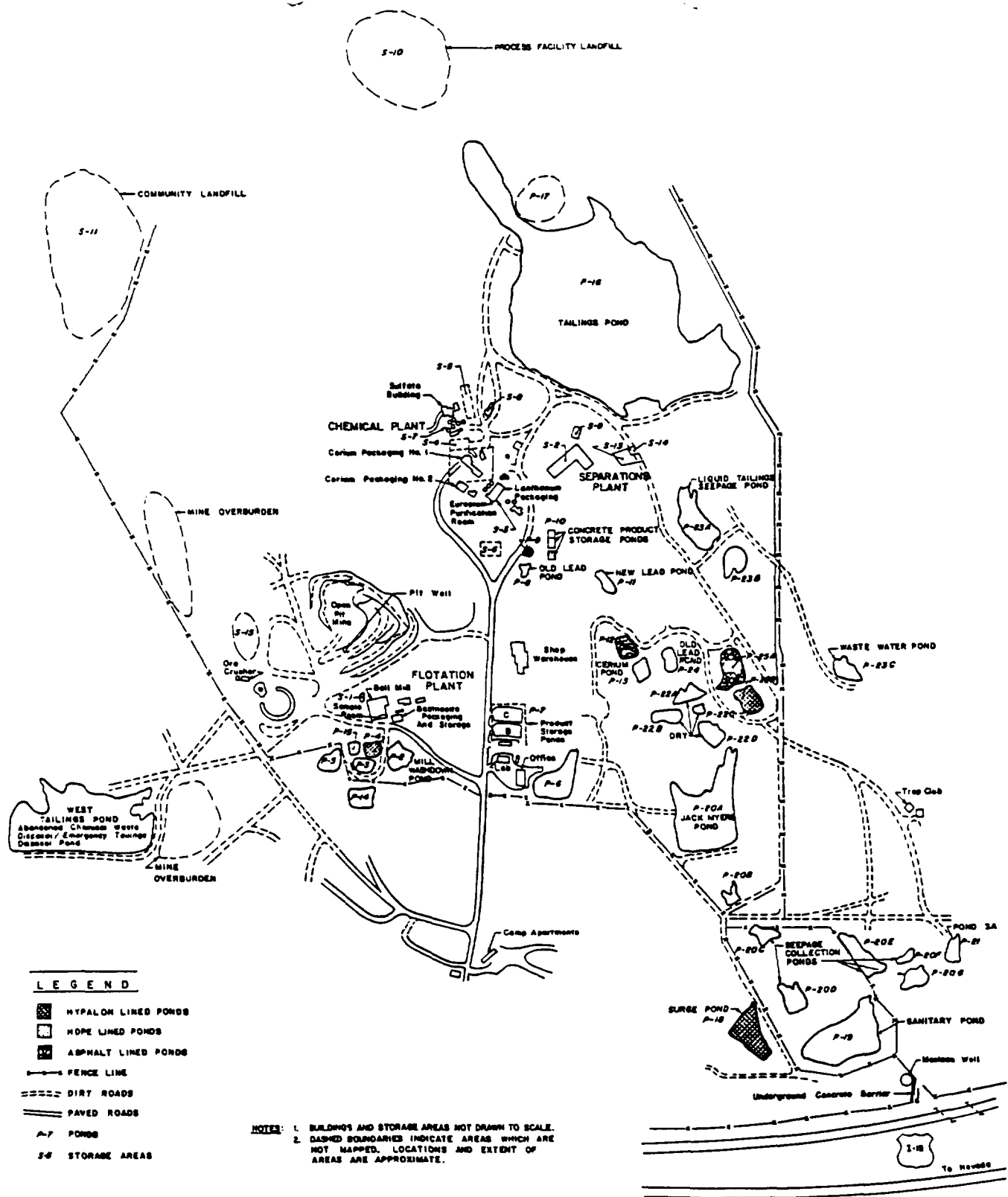
The ore mined on site is Bastnasite. Bastnasite contains the following rare earth elements: cerium, lanthanum, neodymium, praseodymium, samarium, gadolinium, and europium. All of these rare earth elements are mined and processed by Molycorp. The processes involved in element extraction can be summarized as follows: the ore is crushed and conditioned (heated to 190°F), passed through the flotation plant, processed in the chemical plant, and further concentrated in the 96 Cerium plant. Each procedure produces wastes which are addressed in later sections of this document (2). Since the facility's inception wastes have been managed in numerous ponds located throughout the facility. Many of the ponds have since been closed and wastes are now stored in the hazardous waste storage area. A summary of solid waste management units and wastes associated with each is presented in Table 1.

base map source: USGS 1:62500 Clark Mtn, Roach Lake, Mescal Range & Ivanpah quads (CA/NV)



ecology and environment, inc.

Figure 1  
**SITE LOCATION**  
**MOLYCORP**  
 67750 Bailey Road  
 Mountain Pass, CA



ecology and environment, inc.

Figure 2  
**FACILITY MAP**  
**MOLYCORP**  
 67750 Bailey Road  
 Mountain Pass, CA

Table 1

SWMU	Wastes Managed	Source	Start-up Date	Closure Date
Overburden Area	Overburden and waste rock	Open pit mine	1986	
Main Tailings Pond	Tailings slurry	Flotation Process	1966	--
Seepage Ponds	Seepage from Main Tailings Pond	Main Tailings Pond	mid-1960's	--
Storm Water Retention Pond	Storm Water	Mill Site	1960's	--
Domestic Sewage Pond	Domestic waste water	Septic Tanks	mid- to-late 1960's	--
Mill Containment Pond	Process water, flow wash water, and pump gland seal water	Flotation Plant	1986	--
Filter Cake Storage	Lanthanum hydrate, cerium, and unleached Bastnasite ore	Chemical Plant	1965	--
Product Storage Bins	Lanthanum Hydrate	Chemical Plant	1978	--
Cerium Product Storage	Cerium and Baghouse Dust	Flotation and Chemical Plants	--	--
Lanthanum Hydrate Storage	Lanthanum Hydrate Slurry	Chemical Plant	1989	--
Old West Tailings Pond	Tailings and material from clean-closed ponds	Various	late 1960s	--
Lead Sulfide Ponds	Lead and iron wastes	Chemical Plant	late 1960s	--
Inactive Community Landfill	Municipal solid waste	Former Trailer Park	mid-1960s	--
Molycorp Solid Waste Landfill	Domestic waste	Various	early 1960s	--
Wastewater Collection System	Wastewater	Various	1989	--
South Pond	Tailings	Flotation Cells	mid-1960s	(clean-closed)

Table 1 (Cont.)

SWMU	Wastes Managed	Source	Start-up Date	Closure Date
Leach Thick O'Flow	Leach liquor containing lead	Chemical Plant	mid-1960s	--
Russell's Pond	Sulfate liquor	Chemical Plant	1981	1987 (clean-closed)
Frosties Overflow Pond	Tailings water	Flotation Cells	mid-1970s	1986 (clean-closed)
Reagent Spillage	Mill Reagents	Flotation Plant	mid-1960s	--
Surge Pond	Various waste-waters	Chemical Plant	1980	1990 (clean-closed)
Wastewater Ponds	Various waste-waters	Various	mid-1960s	1987 (clean-closed)
Hazardous Waste Storage Area	Various	Various	1984	--
Wastewater Neutralization Plant	Various	Various	1989	--
Old Ivanpah Evaporation Ponds	Wastewater	Wastewater Treatment Plant	1980	1988
New Ivanpah Evaporation Ponds	Wastewater	Wastewater Treatment Plan	1988	--

## 2.2 FACILITY PROCESSES/WASTE MANAGEMENT

### 2.2.1 Historical

On-site operations and waste management processes have not significantly changed since the facility's inception (5). Nearly all of MolyCorp site wastes are plant process effluents and slurry tailings. Historically (and currently) these wastes have been disposed of in on-site evaporation ponds, although the total quantity of wastes deposited is not known (6).

### 2.2.2 Current

The MolyCorp facility consists of an open pit mine, crusher and flotation plant, chemical plant, and 96 Cerium plant. Flowcharts for operations in each of these plants are included in Appendix C (5). A facility map is presented as Figure 2.

#### Crusher and Flotation Plant

Approximately 2000 tons per day of Bastnasite enters the crusher and flotation plant, of which 1850 tons becomes tailings and 150 tons is trucked to the chemical plant as Bastnasite concentrate following a series of crushing, conditioning, separation, thickening, and drying steps. Wastes generated in the crushing and flotation process include overburden, a tailings slurry, crocidolite (an asbestos-containing material), pinion gear grease, and oil-contaminated drums (5,7).

Overburden is classified as Group C mine waste and is generated at a rate of approximately 10,000 tons per day; it is transported to an area northwest of the open pit and stockpiled (8).

Tailings are transported in the form of a slurry to the main tailings pond, which encompasses approximately 40 acres and has been in operation since 1966. Although previous analyses of the tailings have indicated the presence of various heavy metals including lead, barium, and copper, the California Department of Health Services determined that they are nonhazardous on March 10, 1986, based on the solubility of lead sulfide (8).

Crocidolite is shoveled out of flotation cells as a wet solid and put into 55-gallons drums with double plastic liners. The drums are staged in an area to the northeast of the mill before transport to the hazardous waste storage area (7).

Pinion gear grease from equipment maintenance is collected and stored in 42-gallon drums. Approximately one drum per month is generated. These drums are staged on the west side of the mill before transport to the hazardous waste storage area. Pinion gear grease contains 350 ppm of 1,1,1-trichloroethane, petroleum asphalts, and aromatic oils (7).

Oil-contaminated drums are waste product drums that contain 0.5% to 5% oil. They are stored in the hazardous waste storage area before being crushed and disposed of off-site (7).

## Chemical Plant

The chemical plant accepts cerium concentrate from the crusher and flotation plant; the concentrate is fed to a roaster to convert cerium carbonate to cerium oxide and burn off other carbonate materials. A leaching step is employed, followed by thickening, filtration, and drying of the liquid cerium. At this point, some of the cerium concentrate is packaged as product and the rest goes to the 96 Cerium plant as feed stock. Filtrate from a sand filter containing trichlorolanthanum undergoes additional separation via solvent extraction, precipitation, thickening and washing, filtration, and drying to yield a Europium product, and lighter Lanthanum and Neodymium products (see Chemical Plant Drawing No. 2 in Appendix C). Wastes from the chemical plant include "SX Crud" from the solvent extraction processes, various lead and iron mixtures, spent zinc, lubricants and oily wastes, and wastewater. SX Crud consists of dusts that have agglomerated in organic solutions; approximately 20 to 25 55-gallon drums per year are generated. When a full drum of SX Crud accumulates in the chemical plant, it is taken to the hazardous waste storage area. Constituents of SX Crud include 54%-58% non-halogenated organics, 28%-30% non-halogenated organic phosphates, 10%-20% non-halogenated chlorides, and 0.2%-0.14% silica (5,7).

Lead and iron wastes include a ponded lead/iron mixture, iron/lead mixture filter cake, iron filter cake, lead filter cake, lead backwash sludge, and lead sand filter cinders. Prior to August 1985, lead and iron residues were ponded in order to dry them at three locations, although this practice no longer occurs. The wastes contained 80%-86% lead sulfide, 5%-9% ferric hydroxide, and 6%-10% lanthanides. The total ponded quantity of this waste is not known (7).

The iron/lead mixture filter cake is generated from a plate and frame pressure filter. It is currently stored in 55-gallon drums with plastic liners in the hazardous waste storage area. Constituents of this waste include 40%-45% water, 28%-31% lead sulfide, 11%-14.6%  $\text{Ln}(\text{OH})_3$ , 5%-8.6%  $\text{LnCl}$ , 3%-6.4%  $\text{Fe}(\text{OH})_3$ , 3%-6.6%  $\text{AlCl}_3$ , 1%-3%  $\text{SiO}_2$  and 1.8%-2.0%  $\text{ZnS}$  (7).

Iron filter cake and lead filter cake are generated and handled in the same manner as the iron lead mixture. These filter cakes include various inorganic constituents, but primarily metal oxides (7).

Lead backwash sludge is removed from the lead sand filter backwash tank. This material is also placed in 55-gallon drums and stored in the hazardous waste storage area. Constituents of the lead backwash sludge include 60%-80% water, 19%-25% lead sulfide, 2%-5% ferric hydroxide, 1%-2% zinc sulfate, 3%-7% lanthanum chlorides, 7%-12% lanthanum hydrates, 0.7%-2% silica, and 2%-5% aluminum chloride (7).

Lead sand filter cinders are removed by vacuum truck into 55-gallon drums for transport to the hazardous waste storage area. Constituents include 99.4%-99.8% volcanic cinders and 0.02 ppm to 0.06 ppm lead (7).

Waste zinc is generated in the Europium separation process, and stored in 55-gallon drums in the hazardous waste storage area. Constituents include 77% zinc, 2.5% iron, 7.8% mixed  $\text{Ln}(\text{OH})_3$ , 0.7% chloride, 12% free moisture, and less than 0.1% heavy metals (mercury, nickel, lead) (7). Lubricants and oily wastes consist of oily rags and floor sweep material. Approximately 8-12 drums per month are generated and stored in the hazardous waste storage area before being trucked off-site (5).

Wastewater goes to the central wastewater treatment system along with all other plant wastewaters. Wastewaters are pH-adjusted before Lanthanum oxide and lead are precipitated out. Effluent from the treatment system is piped to the Ivanpah Dry Lake, an evaporation pond approximately 13 miles east of the site. In 1983, the California Department of Health Services classified Molycorp's wastewater effluent as not hazardous (5,8,9).

### 96 Cerium Plant

The 96 Cerium Plant converts Grade 5300 Cerium concentrate (60%-68%  $\text{CeO}_2$ ) to a product that is 95% cerium carbonate, through a series of leaching, filtration, precipitation and drying steps. Wastes generated in the 96 Cerium plant include a cerium fluoride filter cake, lead residue filter cake, and barium sulfate (7).

The lead residue is placed in 55-gallon drums and stored in the hazardous waste storage area, pending final disposal classification from DTSC. Approximately 5000 pounds per year of lead residue filter cake are generated. The cerium fluoride filter cake is non-hazardous according to Molycorp, and the barium sulfate, as part of the tailings, is also not hazardous (7).

Prior to January 1992, Molycorp operated a separation plant which generated waste precoat filter media consisting of 50% to 70% diatomaceous earth, 10 parts per million (ppm) to 30 ppm silica, 2 ppm to 3 ppm aluminum, 1 ppm to 3 ppm calcium, 1 ppm to 3 ppm iron, and 0.07 ppm to 0.08 ppm zinc. This material was placed in 55-gallon drums and staged in an area on the southwest side of the plant before being moved to the hazardous waste storage area (7).

## **3. REGULATORY INVOLVEMENT**

### **3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)**

According to the RCRA database, Molycorp first submitted a Notification of Hazardous Waste Activity on August 7, 1980 (10). On November 17, 1980, Molycorp submitted a RCRA Part A application to EPA (11). Subsequently, Molycorp's primary involvement with EPA has been in regard to the regulatory status of certain lead/iron precipitate wastes from the Chemical Plant. On March 10, 1981, Molycorp initially contacted EPA regarding the Bevill Amendment, which excludes some mineral processing wastes from regulation under RCRA Subtitle C, depending on whether they are determined to be processing wastes or beneficiation wastes. On May 14, 1991, EPA determined that the wastes in question were processing



wastes and therefore were not excluded from RCRA Subtitle C regulations (11). However, since that determination was made, EPA has reconsidered its position on the status of the wastes (23). As of the E & E site visit on March 13, 1992, a final determination had not been made.

The EPA Field Investigation Team (FIT) completed a Preliminary Assessment (PA) of the Molycorp facility in December 1983. The PA concluded that there was not sufficient information to make a proper evaluation of the facility (24). FIT conducted a site inspection of the Molycorp site in March 1985. The Site Inspection Report indicated that additional EPA action at Molycorp was not necessary based on the involvement of the Lahontan RWQCB (3).

### 3.2 CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)

Amended RCRA Part A hazardous waste permit applications were submitted to DTSC by Molycorp in October 1987, June 1991, and January 1992. The first two amendments were requests to store materials not previously listed for more than 90 days; the third was a request to treat certain lead/iron precipitates using a stabilization technology (12).

On May 23, 1991, DTSC issued a Corrective Action Order and Complaint for Penalty Order to Molycorp regarding storage of various lead and iron wastes not specified on their Part A application, for greater than 90 days, inadequacies regarding their hazardous waste storage area, failure to prepare a complete closure plan for the hazardous waste storage area, and other violations (13). In response to this order, Molycorp submitted a revised Part A application as noted above and proposed four alternatives regarding the lead and iron wastes (12,14). The issues addressed in the DTSC order of May 23, 1991, are partially contingent on EPA's determination regarding the status of lead and iron wastes described above (16). As of the date of the E & E site visit of March 13, 1992, these issues had not been resolved. DTSC does not regularly inspect the Molycorp Mountain Pass facility (31).

### 3.3 CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)

The RWQCB has been involved at the Molycorp site since 1953 when a well located approximately 1/2-mile south of the Molycorp facility was sampled and found to contain various compounds only slightly below Public Health Service Standards for drinking water (3). This well was used by the State Division of Highways (SDH) and served 8 to 12 people. Four other wells also existed near the SDH well: two owned by Molycorp and two known as the Mexican wells (see Figure 2). In response to the contamination in these wells, Molycorp imported potable water beginning in 1955. A summary of RWQCB's most recent actions regarding Molycorp is as follows:

- o On September 19, 1981, RWQCB established waste discharge requirements for Molycorp under Board Order No. 6-81-73 (15).

- o On October 3, 1985, RWQCB issued Time Schedule Order (TSO) No. 6-85-116, which required an investigation of the effects of leakage from old evaporation ponds (15).
- o On November 4, 1985, under the Toxic Pits Cleanup Act (TPCA), RWQCB notified Molycorp that the old evaporation ponds contained hazardous constituents (lead) and that a Hydrogeological Assessment Report (HAR) was required. Molycorp submitted the HAR on December 30, 1985. RWQCB reviewed the HAR and found it to be adequate (15).
- o On August 14, 1986, RWQCB issued Cease and Desist Order (CDO) No. 6-86-101 which required Molycorp to stop discharging waste in violation of Board Order No. 6-81-73. A time schedule required replacement of the existing pond by September 1, 1987 (15).
- o On November 13, 1987, RWQCB issued Resolution No. 6-87-151 approving a closure exemption for all Molycorp ponds (15).
- o On September 13, 1990 RWQCB issued Board Order No. 6-90-56 to ensure that closure of the old evaporation ponds would be conducted according to regulations in Title 23, Subchapter 15 of the California Code of Regulations, and that post-closure maintenance would be conducted (15).
- o On June 13, 1991, RWQCB issued Board Order No. 6-91-836 to revise waste discharge requirements to reflect 1984 revisions to Subchapter 15, including modifications to Molycorp's waste management strategy, and incorporating provisions for a contaminated groundwater corrective action plan (6).

#### 3.4 SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

The SCAQMD has no known involvement at Molycorp (25).

#### 3.5 OTHER AGENCY INVOLVEMENT

The San Bernardino County Department of Environmental Health Services (DEHS) and Air Pollution Control District (APCD) each periodically inspect the Molycorp site, but neither has had extensive involvement. Molycorp has a total of 81 APCD permits (26).

### 4. DESCRIPTIONS OF INDIVIDUAL SOLID WASTE MANAGEMENT UNITS

Distinct Solid Waste Management Units (SWMUs) have been identified to evaluate potential on-site sources, types, and quantities of releases to air, surface water, groundwater, and soil. An SWMU is defined as any discernible waste management unit at a facility from which hazardous constituents might migrate, irrespective of whether the unit was intended for the management of solid and/or hazardous waste. As a result of this Preliminary Assessment, E & E has identified 26

significant SWMUs at the site. It appears that at least one of these units is RCRA-regulated. Additional SWMUs may exist.

#### 4.1 OVERBURDEN AREA

Unit Description: Approximately 10,000 tons per day of overburden and waste rock are generated from the open pit mine and transported to an area northwest of the pit, which encompasses 46.6 acres. The overburden is classified as Group C mine waste (8).

Date of Start-up: 1986 (29)

Date of Closure: The overburden area is active (5).

Waste Managed: Overburden and waste rock (8).

Release Controls: None documented.

History of Releases: Although the overburden and waste rock are solid, nonhazardous wastes, sampling has not been conducted to determine whether a release has occurred.

#### 4.2 MAIN TAILINGS POND

Unit Description: The Main Tailing Pond encompasses 40 acres and receives 7000 to 17,000 tons per day of tailings slurry from the flotation circuit in the Cerium 96 plant. The liquid portion of the slurry is evaporated, and percolated through the impoundment to groundwater or returned to the mill for reuse. Seepage from the unlined pond is estimated to be up to 100 gallons per minute (8).

Date of Start-up: Wastes were first received at the Main Tailings Pond in 1966. Prior to 1966, tailings were disposed to the Old West Tailings Pond.

Date of Closure: The Main Tailings Pond is active (5).

Wastes Managed: Chemicals used in the flotation process are soda ash, lignin sulfonate, and commercial fatty acids, such as oleic acid and maleic acid. Data collected and analyzed by Molycorp between 1974 and 1985 indicated the liquid portion of the slurry contains 7700 milligrams per liter (mg/L) total dissolved solids (TDS), 1.4 mg/L lead, 308 mg/L nitrate, 20 mg/L barium and 1,200 mg/L sulfate. Total metal concentrations consist in part of 10,000 milligrams per kilogram (mg/kg) barium, 250 mg/kg copper, and 1,000 mg/kg lead. The pH range of the slurry is 7 to 9. On March 10, 1986, DTSC determined that the tailings are nonhazardous based on the solubility of lead sulfide in the waste stream at the time of classification (8).

Release Controls: Seepage from the unlined pond is estimated to be up to 100 gallons per minute. MolyCorp is undertaking a study of the methods used for slurry disposal. A fine tailings deposition plan called "dry stacking" is expected to partially seal the pond (8). The pond is bermed and sloped to collect liquids at the north end (3,5).

History of Releases: Seepage from the unlined pond is estimated to be up to 100 gallons per minute (8).

#### 4.3 SEEPAGE PONDS

Unit Description: Seepage from the Main Tailings Pond flows downward to groundwater and then through a tailings dam into two seepage collection ponds, which encompass a total of approximately 2 1/2 acres (29). From the seepage collection ponds about 17,000 gallons per day of water is pumped to the Ivanpah Evaporation Ponds (8). The seepage ponds are located to the southeast of the Main Tailings Pond (see Figure 2).

Date of Start-up: Mid-1960s (29)

Date of Closure: The seepage ponds are active (8).

Waste Managed: A grab sample analysis of water from the seepage ponds by RWQCB staff in 1990 indicates that the pond water contains 550 mg/l nitrate as nitrogen, 7600 mg/L total dissolved solids, turbidity of 6.6 Nephelometric Turbidity Units (NTU), 2.3 mg/L barium, 1.9 mg/L lead, 16 mg/L surfactants and 103 mg/L tannin and lignin compounds as tannin acid (8).

Release Controls: The seepage ponds are unlined (8).

History of Releases: Because the seepage ponds are not lined, it is assumed that a release to the soil has occurred.

#### 4.4 STORM WATER RETENTION POND (Jack Myers Pond)

Unit Description: The storm water retention pond (or Jack Myers Pond) is an unlined, 3.2-acre pond used to control 80,000 gallons of storm water runoff from the mill site. It is located to the east of the office building (see Figure 2).

Date of Start-up: 1960s (29).

Date of Closure: The storm water retention pond is active (8).

Waste Managed: No known analyses of the storm water have been conducted.

Release Controls: The storm water retention pond is unlined (8).

History of Releases: Because the storm water retention pond is unlined, it is assumed that a release to soil has occurred.

#### 4.5 DOMESTIC SEWAGE POND

Unit Description: The domestic sewage pond receives domestic waste water from the plant following treatment in a series of septic tanks. The capacity of the pond is 12.5 million gallons (8).

Date of Start-up: Mid- to late 1960s (29)

Date of Closure: The domestic sewage pond is active (8).

Waste Managed: Domestic wastewater (8).

Release Controls: The domestic sewage pond is unlined (8).

History of Releases: Since the domestic sewage pond is unlined, it is assumed that a release to soil has occurred.

#### 4.6 MILL CONTAINMENT POND

Unit Description: The mill containment pond receives some process water, flow wash water, and pump gland seal water from the flotation plant. In the event of a power failure, all of the flotation and thickener tanks from the flotation plant are drained onto the floor of the facility to prevent the product from solidifying in the tanks. Both the products and the reagents are then discharged to the mill containment pond. When the power is restored, the products and reagents are pumped back into the mill. The mill containment pond's capacity is 3 million gallons (8).

Date of Start-up: 1986 (29).

Date of Closure: The mill containment pond is active (8).

Waste Managed: The mill discharge to this pond averages 1 million gallons per month and contains in part 6000 mg/L TDS and 6 mg/L strontium (8).

Release Controls: The mill containment pond is concrete-lined (8).

History of Releases: Since sampling beneath the mill containment pond has not been conducted, it is not known whether a release has occurred.

#### 4.7 FILTER CAKE STORAGE

Unit Description: Two contiguous asphalt pads are used for the temporary storage of mill material. Pad 7A is 8 feet deep, approximately 29,000 square feet in area and has a 4- to 6-inch asphalt liner. Pad 7B is 4 feet deep, approximately 17,600 square feet in area, and has a 4- to 6-inch asphalt liner. Lanthanum hydrate, cerium, and unleached Bastnasite ore are cycled in and out of these pads as mill processing requirements dictate (8).

Date of Start-up: Approximately 1965 (29).

Date of Closure: The filter cake storage pads are active (8).

Waste Managed: Lanthanum hydrate, cerium, and unleached Bastnasite ore (8) are stored in this area.

Release Controls: 4- to 6-inch asphalt liner (8).

History of Releases: Since sampling beneath the filter cake storage area has not been conducted, it is not known whether a release has occurred.

#### 4.8 PRODUCT STORAGE BINS

Unit Description: This pond consists of a series of three aboveground concrete storage product bins. Each bin is constructed of 8 to 10 inches of reinforced concrete and is approximately 30 feet square. Various products from the chemical and separation plants are temporarily stored here. When the bins are used as dewatering tanks for a slurry product, the liquid is sent to the Ivanpah Evaporation ponds (8).

Date of Start-up: 1978 (29).

Date of Closure: The product storage bins are active (8).

Waste Managed: Samarium gadolinium carbonate feed stock was stored in these bins until 1986, and after that, lanthanum hydrate (29).

Release Controls: Each bin is constructed of 8 to 10 inches of reinforced concrete (8).

History of Releases: Since sampling beneath the product storage bins has not been conducted, it is not known whether a release has occurred.

#### 4.9 CERIUM PRODUCT STORAGE

Unit Description: This is a bermed pond with an asphalt bottom, and contains cerium and baghouse dust. The existing contents will be processed as saleable products, the pond will be clean-closed, and the closure plan will be submitted to the RWQCB for approval (8).

Date of Start-up: Not determined.

Date of Closure: The cerium product storage pond is active (8).

Waste Managed: Cerium and baghouse dust (8).

Release Controls: Bermed pond with an asphalt bottom (8).

History of Releases: Since sampling beneath the cerium product storage has not been conducted, it is not known whether a release has occurred.

#### 4.10 LANTHANUM HYDRATE STORAGE

Unit Description: This pond is used for the storage of lanthanum hydrate. Approximately 80,000 to 100,000 gallons per day of slurry is pumped here. The water is decanted and disposed of in the Ivanpah Evaporation ponds. The solids will settle and remain in the pond until the market has improved. This pond is equipped with a single 80-mil HDPE liner, and has four gypsum blocks beneath the liner and eight gypsum blocks on the perimeter as moisture sensors. The pond encompasses approximately 1.2 acres and has a capacity of 3,000,000 gallons (8).

Date of Start-up: 1989 (29).

Date of Closure: The Lanthanum hydrate storage pond is active (8).

Waste Managed: Lanthanum hydrate slurry (8).

Release Controls: 80-mil HDPE liner, and four gypsum blocks beneath the liner and eight gypsum blocks on the perimeter as moisture sensors (8).

History of Releases: None documented.

#### 4.11 OLD WEST TAILINGS POND

Unit Description: This was the original tailings pond at the mill. It is located to the west of the Flotation Plant (see Figure 2) and encompasses approximately 15 acres (29). Currently, it contains all material removed from the "clean-closed" ponds. After the other old ponds at the mill site are closed, this pond will be closed (8).

Date of Start-up: Late 1960s (29).

Date of Closure: The Old West Tailing pond is active (8), but is but is planned for closure in 1993 or 1994 (29).

Waste Managed: Mine tailings and material from "clean closed" ponds (8).

Release Controls: This pond is an earthen berm over natural soils with no liners (29).

History of Releases: Since this pond is not lined, it is assumed that a release to soil has occurred.

#### 4.12 LEAD SULFIDE PONDS

Unit Description: These ponds contain lead- and iron-bearing wastes from the chemical plant. They are currently inactive. These ponds will be subject to closure requirements under a separate Board Order if closed in place. This Order requires final closure plans to be submitted for these ponds (8). Pending resolution of the status of lead and iron wastes (see Section 3.1), this unit could be RCRA-regulated.

The lead sulfide ponds are located to the south of the Separations Plant on Figure 2 ("New Lead Pond" and "Old Lead Ponds").

Date of Start-up: Late 1960s (29).

Date of Closure: The lead sulfide ponds are currently active. Closure is under discussion with the Lahontan RWQCB (29).

Waste Managed: Lead- and iron-bearing wastes from the chemical plant (8).

Release Controls: The ponds are inspected after major storms (29).

History of Releases: Since the lead sulfide ponds are not lined, it is assumed that a release to soil has occurred.

#### 4.13 INACTIVE COMMUNITY LANDFILL

Unit Description: Northwest of the mill site is an inactive landfill that received municipal solid waste at the time that a fairly large trailer park operated at the mine. The landfill became inactive in 1987, and is listed on the Solid Waste Assessment Test (SWAT) list, Rank 6, which requires a report by July 1, 1992 (8). The inactive community landfill is located to the northwest of the chemical plant (see Figure 2), and encompasses approximately 6.5 acres (29).

Start-up Date: Mid-1960s (29).

Closure Date: A closure plan will be completed by November 1992 (29).

Waste Managed: Municipal solid waste (8).

Release Controls: The landfill is periodically inspected for erosion (29).

History of Releases: Since the landfill is not lined, it is assumed that a release to soil has occurred.

#### 4.14 MOLYCORP SOLID WASTE LANDFILL

Unit Description: A solid waste disposal area is currently used by MolyCorp, and is located in an area north and upgradient of the main tailings pond. Only domestic waste is reportedly placed here. This landfill is listed as Rank 6 on the SWAT, which requires a report by July 1, 1992. This landfill is not permitted and a Report of Waste Discharge will be requested by the RWQCB. Operating waste discharge requirements and a California Integrated Waste Management Board solid waste permit issued by San Bernardino County are required for this landfill (8).

Start-up Date: early 1960s (29).



Closure Date: A closure plan will be completed by November 1992 (29).

Waste Managed: Domestic waste (8).

Release Controls: None documented.

History of Releases: Since the landfill is not lined it is assumed that a release to soil has occurred.

#### 4.15 WASTEWATER COLLECTION SYSTEM

Unit Description: This system collects effluent from various points at the mill site and delivers it, through a pipeline, to the New Ivanpah Evaporation Ponds. Also included in this combined waste stream is contaminated groundwater that is extracted from a number of "interceptor" wells downstream of the in site. A continuous groundwater extraction program has been in existence since 1980 (8).

Start-up Date: 1989 (29).

Closure Date: The wastewater collection system is active (8).

Waste Managed: Effluent from various points at the mill site and groundwater from extraction wells downstream of the mine (8). TDS levels are typically 15,000 to 20,000 ppm, which is primarily due to the presence of chloride salts including calcium, strontium, and ammonia (29).

Release Controls: Pipelines are patrolled daily (29).

History of Releases: Since sampling beneath the pipe lines has not been conducted it is not known whether a release has occurred.

#### 4.16 SOUTH POND

Unit Description: The South Pond was an unlined emergency pond used for slurry that had undergone further separation in the flotation cells (3). It was located south of the Flotation Plant.

Start-up Date: mid-1960s (29).

Closure Date: Use of the South Pond was discontinued in 1987 (29) and it was clean-closed in 1990 (8).

Waste Managed: Tailings (8).

Release Controls: Unlined (3).

History of Releases: Since the pond is unlined, it is assumed that a release to soil has occurred.

#### 4.17 LEACH THICK O'FLOW

Unit Description: This unit is a pond that contains liquid effluent from a mill operation that leached calcium carbonate and strontium carbonate from Bastnasite concentrate. Use of the pond was discontinued in 1989 and it is scheduled for closure in 1993. It is located immediately south of the flotation plant and encompasses approximately 22,000 square feet (32).

Start-up Date: Mid-1960s (32).

Closure Date: Use of the pond was discontinued in 1989 and it is scheduled for closure in 1993 (32).

Waste Managed: Leach liquor, which contained lead that was precipitated as carbonate (32).

Release Controls: The pond has a membrane (Hypalon) liner (32).

History of Releases: Since sampling has not been conducted, it is not known whether a release has occurred.

#### 4.18 RUSSELL'S POND

Unit Description: This pond was used to collect and store sulfate liquor containing samarium and gadolinium (29). It is located southeast of the chemical plant (8).

Start-up Date: 1981 (29).

Closure Date: 1987 (8).

Waste Managed: Samarium/gadolinium liquor

Release Controls: Membrane liner (29).

History of Releases: Soil samples were collected beneath the pond in 1986 during closure activities and were analyzed for lead. No lead contamination was found (33).

#### 4.19 FROSTIES OVERFLOW POND

Unit Description: The Frosties Pond was an unlined emergency pond that was used during power failures to empty the flotation cells (3). It was located south of the Flotation Plant (8).

Start-up Date: Mid-1970s (29).

Closure Date: 1986 (8).

Waste Managed: Tailings water (3).

Release Controls: Unlined (3).

History of Releases: Post-closure analysis of the pond bottom solids indicated acid-soluble lead up to 110 ppm, and CAM WET lead up to 0.71 ppm (34).

#### 4.20 REAGENT SPILLAGE

Unit Description: This pond was used to collect spilled reagents from the flotation plant including sodiumlignosulphonate and minor amounts of fuel oil (29).

Start-up Date: Mid-1960s (29).

Closure Date: This unit has not been used since 1985 but closure is not yet complete (29).

Waste Managed: Mill Reagents (8).

Release Controls: None documented.

History of Releases: Closure samples from soil beneath the pond indicated total petroleum hydrocarbons up to 1900 ppm, lead up to 9600 ppm, sodium lignin sulfonate up to 53 ppm, and various other metals at lower concentrations (35).

#### 4.21 SURGE POND

Unit Description: This pond was used to collect chemical plant wastewaters (29).

Start-up Dates: 1980 (29).

Closure Date: Use of the Surge Pond was discontinued in 1988 (29) and it was clean-closed in 1990 (8).

Waste Managed: Plant wastewaters (29).

Release Controls: None documented.

History of Releases: Closure samples collected from soil beneath the pond indicated total lead concentrations up to 23 ppm (35).

#### 4.22 WASTEWATER PONDS

Unit Description: A total of 10 wastewater ponds were used as an evaporation/percolation system for plant wastewater (29).

Start-up Date: Mid-1960s (29).

Closure Date: These ponds were used through 1980 (29) and clean-closed in 1987 (8).

Waste Managed: Wastewater (8).

Release Controls: None documented.

History of Releases: Closure samples collected from soil beneath these ponds indicated total lead up to 0.2%, and total zinc up to 0.035% (36).

#### 4.23 HAZARDOUS WASTE STORAGE AREA

Unit Description: The hazardous waste storage area is an unlined area away from the open pit mine and processing areas. The area is graded to minimize water run off through the stored material, although no secondary containment is present (5,7). Since hazardous wastes are stored here for greater than 90 days, it appears that this unit is RCRA-regulated.

Drums are stacked in rows of two drums on pallets with aisle ways between each row (7). The hazardous waste storage area encompasses approximately 120,000 square feet and has a capacity of approximately 15,000 drums (29).

Start-up Date: 1984 (5).

Closure Date: The hazardous waste storage area is active (5).

Waste Managed: All hazardous wastes as discussed in Section 2.2.2 are stored at the hazardous waste storage area. Most wastes are heavy metal residues (5). Prior to 1984, most wastes were pumped to surface impoundments (5). Waste mercury residue that was found in an old drain trench is also stored in this area, pending Molycorp's attempts to locate a disposal facility that will accept it. Mercury was formerly used on-site as an amalgum for europium processing (5, 30).

Release Controls: The area is graded to minimize water runoff through the stored material (7). It is not paved, bermed, or roofed (5).

History of Releases: According to a DTSC Corrective Action Order of May 23, 1991, Molycorp disposed of hazardous wastes within the hazardous waste storage area on January 14, 1991, and April 9, 1991. The DTSC Order noted a "disintegrated drum" on January 14 and a "drum labeled magnesium waste had spilled hazardous wastes to the ground" on April 9, 1991 (16). During the E & E site visit on March 13, 1991, discolored liquids were noted in the hazardous waste storage area (5). See Appendix B.

#### 4.24 WASTEWATER NEUTRALIZATION PLANT

Unit Description: Wastewaters from throughout the plant are pH-adjusted at the neutralization plant before lanthanum oxide and lead are precipitated out. Effluent from the treatment system is piped to the Ivanpah Dry Lake, an evaporation pond approximately 13 miles east of the site. In 1983, the California Department of Health Services classified Molycorp's wastewater effluent as not hazardous (5,8,9).

Start-up Date: 1989 (29).

Closure Date: The wastewater neutralization plant is an active unit (5).

Waste Managed: Wastewaters from throughout the plant (5). Recent sample data indicate strontium up to 1300 ppm, nitrate up to 450 ppm, sulfate up to 510 ppm, chloride up to 12,000 ppm, TDS up to 24,000 ppm, and a maximum pH of 8.10 (35).

Release Controls: Pipelines are patrolled daily (29).

History of Releases: None documented.

#### 4.25 OLD IVANPAH EVAPORATION PONDS

Unit Description: In 1980 and 1981, two rectangular 38-acre evaporation ponds were constructed on Ivanpah Dry Lake, approximately 13 miles to the east of the site. In 1985 groundwater monitoring wells were installed and sample results indicated increasing total dissolved solids (TDS) levels. Consequently, the ponds were determined to be leaking (17).

Start-up Date: 1980 and 1981 (17).

Closure Date: 1988 (17).

Waste Managed: Wastewater as previously described (17).

Release Controls: A lower clay liner consists of native clay, 1-foot thick, compacted to 95% of maximum dry density with an expected permeability of  $1 \times 10^{-8}$  cm/sec (18).

History of Releases: In 1985, the ponds were determined to be leaking based on increasing TDS levels in groundwater monitoring wells (17).

#### 4.26 NEW IVANPAH EVAPORATION POND

Unit Description: In 1988, a 100-acre evaporation pond was constructed three miles north of the old ponds to receive the wastewater (17,18).

Start-up Date: 1988 (17).

Closure Date: The New Ivanpah Evaporation Pond is an active unit (5).

Waste Managed: Wastewater as previously described (17).

Release Controls: Lake bed playa deposits are homogeneous stratified clays with depths of greater than 300 feet under the evaporation ponds; vertical permeabilities range from  $1 \times 10^{-5}$  cm/sec to  $1 \times 10^{-8}$  cm/sec. (19).

History of Releases: Quarterly sampling of monitoring wells in the vicinity of the New Ivanpah Pond is conducted. Recent data indicate downgradient levels of strontium up to 38 ppm, conductivity up to 45,000 umho/cm, TDS up to 34,000 ppm, and nitrate up to 20 ppm (35).

## 5. CORRECTIVE ACTION (CA) CONSIDERATIONS

The PA Review Form criteria are used to assess the relative threat associated with actual or potential releases of hazardous substances from sites. It is the principal mechanism EPA uses to determine whether corrective action is necessary and, if so, the priority for implementing corrective action. E & E has evaluated the following factors relative to this site.

### 5.1 GROUNDWATER PATHWAY

The Molycorp area of the Clark Mountain Range (4,500 feet elevation) is composed of earlier precambrian metamorphic rock which drains eastward down the Wheaton Wash of recent Alluvium (Cenozoic) to the Quarternary Lake Deposits of the Ivanpah Dry Lake at 2,600 feet. Bordering the Clark Mountains to the west is the Mescal Range and Shadow Valley, and to the south are the Ivanpah Mountains (3).

Above the Mexican Well, there are 2 square miles of unconsolidated quarternary alluvium storing water. Bedrock is shallow, and forces water to the surface at the Mexican Well. Recent sediments in the Wheaton Wash, down to the Ivanpah Groundwater basin, provide a 1,000 foot wide channel to carry underflow. Within the Ivanpah groundwater basin the limestone, dolomite and granite are slightly fractured, allowing only minimal volumes of water to pass to the unconsolidated water bearing sediments (37).

The "water bearing unit" beneath the site is the younger alluvial materials, with some minor production from the fractured bedrock. The groundwater flow direction is generally from north to south under the site, splitting, with an eastern component down Wheaton Wash towards Ivanpah Dry Lake and a western component down the Western Gap towards the Shadow Valley. A groundwater mound has developed under the main tailings pond and a cone of depression has developed from mine pit dewatering. Both have influenced the groundwater flow patterns. An ancient alluvial filled subterranean canyon exists, somewhat parallel to Interstate 15, that may influence deep groundwater flow. The background water quality is relatively good with total dissolved solids (TDS) of 300 to 900 mg/l, neutral pH, and heavy metals near detection limits. Industrial supply water for the Molycorp Mountain Pass Operations comes from wells located in the Ivanpah Valley to the east and the Shadow Valley to the west (8).

There is no known domestic groundwater use within three miles of the site. The net annual precipitation in the Mountain Pass area is -90 inches (6). Groundwater beneath the site is encountered from approximately 100-150 feet below ground surface and flows south and east toward the Wheaton Wash drainage area (27).

As indicated in Section 3.3, use of the Mexican Well and four other wells approximately one-half mile south of Molycorp was discontinued in 1955 when levels of various compounds were found to be only slightly below Public Health Service Standards for drinking water (3). In 1978 RWQCB staff collected additional samples from the Mexican Well and several downgradient monitoring wells. The 1978 sample data indicated levels of strontium up to 138 mg/l, chloride up to 4,800 mg/l and TDS up to 8,290 mg/l. According to the RWQCB these levels were considerably higher than corresponding background levels (28).

## 5.2 SURFACE WATER PATHWAY

The closest surface water body to the site is the Ivanpah Lake, a dry lake located approximately 4 miles from the site. Surface water within 4 miles of the site is not used for drinking or agricultural purposes (6).

The one-year 24-hour rainfall value for the Mountain Pass area is 0.75 inches (21).

## 5.3 SOIL EXPOSURE AND AIR PATHWAY

Although active Molycorp ponds as described in Section 4 are not covered, and the San Bernardino Air Pollution Control District documented two opacity violations in February 1992, there are no target populations within four miles of the site (22).

Molycorp is located 4 miles from four Federally Designated endangered species' habitats: the Virginia warbler (Vermivaro Virginiae), the Yellow-breasted chat (Icteria virens), the Pale big-eared bat (Plecotus townsendii pallescens), and the Kingston mountain chipmunk (Tamias panamintinus acrus) (6).

## 6. SUMMARY OF INVESTIGATIVE ACTIVITIES

### 6.1 AGENCIES CONTACTED

Through the course of this investigation E & E contacted the following agencies and obtained file information as appropriate:

- o California Environmental Protection Agency, Department of Toxic Substances Control;
- o California Regional Water Quality Control Board, Lahontan Region (RWQCB);
- o San Bernardino County Air Pollution Control District (APCD); and
- o San Bernardino County Department of Environmental Health Services (DEHS).

### 6.2 RECONNAISSANCE OBSERVATIONS

E & E field team members Chris Lichens and Paul Cort visited the Molycorp site on Friday, March 13, 1992. The site visit began with a discussion of the Molycorp manufacturing process with an emphasis on types of wastes generated. Molycorp personnel involved in this discussion included Grover Eaton, Chief Engineer; Jim Strong, Environmental Coordinator; and Geoffrey Nason, Resident Geologist. Following the discussion Grover Eaton conducted a tour of the plant and waste management units.

Information gathered during the site reconnaissance is presented throughout this report. For additional information, refer to the Site Reconnaissance Interview and Observations Report in Appendix A and the photographs in Appendix B.



## **7. EMERGENCY RESPONSE CONSIDERATIONS**

The National Contingency Plan [40 cfr 300.415(b)(2)] authorizes the Environmental Protection Agency to consider emergency response actions at those sites which pose an imminent threat to human health or the environment. For the following reasons a referral to Region IX's Emergency Response Section does not appear to be necessary:

- o Extensive oversight by the RWQCB and DTSC.

## 8. SUMMARY OF CORRECTIVE ACTION CONSIDERATIONS

The Molycorp, Inc. site is located in Mountain Pass, California, San Bernardino County, approximately 60 miles southwest of Las Vegas, Nevada. Molycorp mines and processes rare earth elements at the Mountain Pass facility. Processing consists of crushing and conditioning in the flotation plant, separation of desired rare earth elements in the chemical plant, and further concentration in the 96 Cerium Plant (3,6). Mine tailings, wastewater and related wastes have historically been discharged to on-site evaporation ponds. Although the tailings and wastewater have been categorized as non-hazardous by the Department of Toxic Substances Control, leaking ponds were determined to be causing high Total Dissolved Solids levels downgradient of the site (17).

The Department of Toxic Substance Control has also been involved with the classification of lead and iron wastes, and has been responsible for regulating Molycorp's RCRA wastes (12,13,14). In addition, the Department of Toxic Substances Control has issued a Corrective Action Order and Complaint for Penalty Order with regard to violations at the hazardous waste storage area.

Historically, the Regional Water Quality Control Board has been the lead agency at Molycorp. The Regional Water Quality Control Board established waste discharge requirements for Molycorp in 1973 and has regulated activity with respect to on-site ponds through various other orders and requirements (17). Molycorp submitted a Notification of Hazardous Waste Activity form to EPA Region 9 in 1980, and subsequently has been involved with EPA regarding the status of several lead and iron wastes (11).

There are no groundwater, surface water or air pathway target populations within four miles of the site (6,20). However, discharges to on-site evaporation ponds through the years have caused elevated TDS levels in groundwater downgradient of the site (17). Consequently Molycorp installed "interceptor" wells and has operated a continuous groundwater extraction program since 1980 (17).

9. EPA RECOMMENDATION

	<u>Initial</u>	<u>Date</u>
No Further Remedial Action Planned under CERCLA	_____	_____
Higher-Priority SI under CERCLA	_____	_____
Lower-Priority SI under CERCLA	_____	_____
Defer to Other Authority (e.g., RCRA, TSCA, NRC)	<u>fu</u>	<u>2-1-93</u>
Notes:		

## 10. REFERENCES

1. Regional Water Quality Control Board, Board Order 6-81-73 (undated).
2. Molycorp, Inc., "Rare Earths Mean Molycorp", (publication date: unknown).
3. Site inspection, Susan Keydel, Greg Sheperd, Ecology and Environment, Inc., Field Investigation Team (E & E, FIT), March 1985.
4. Molycorp, Inc., "Molycorp Mountain Pass Operations", (publication date: unknown).
5. E & E site visit, March 13, 1992.
6. E & E Screening Site Inspection Reassessment, June 30, 1990.
7. Molycorp Hazardous Materials Business Plan.
8. California Regional Water Quality Control Board Order Number 6-91-836.
9. Letter from Paul H. Williams to George H. Duker, October 20, 1983.
10. Resource Conservation and Recovery Act (RCRA) database, October 16, 1991.
11. Letter from Mark A. Smith to Sylvia K. Lawrence and Daniel W. McGovern, November 14, 1991.
12. Letter from R. Gene Dewey to John Hinton, January 20, 1992.
13. Memorandum from Paula Rasmussen to John A. Hinton, May 23, 1991.
14. Memorandum from James T. Allen to John A. Hinton, October 31, 1991.
15. California Regional Water Quality Control Board, Order Number 6-90-56.
16. DTSC Corrective Action Order, and Complaint for Penalty, May 23, 1991.
17. California Regional Water Quality Control Board Order Number 6-90-56.
18. Draft Mining Waste Environmental Effects Summary, EPA, July 2, 1991.
19. California Regional Water Quality Control Board, Order Number 6-90-41.
20. GEMS Database.

21. U.S. Department of Commerce, Rainfall Frequency Atlas of the United States, Technical Paper Number 40, US Government Printing Office, Washington, D.C., 1983.
22. San Bernardino County Air Pollution Control District file information 2/13/92.
23. Letter from William F. Soo Hoo to Silvia K. Lowrance regarding Molycorp lead and iron filtercake, February 27, 1992.
24. EPA CERCLIS Database.
25. E & E Contact Report of 1/29/92, Norm Manson of the South Coast Air Quality Management District, regarding district involvement at Molycorp.
26. Molycorp RCRA Part A Permit, January 21, 1992.
27. Underground Injection Control (UIC) Program Site Inspection Form, California Regional Water Quality Control Board, June 11, 1981.
28. Letter from Roy C. Hampson to J. Wayne Cole regarding Molycorp's violation of RWQCB waste discharge requirements, April 11, 1978.
29. Letter from Grover Eaton to Chris Lichens, August 24, 1992.
30. E & E Contact Report of August 10, 1992, Grover Eaton of Molycorp regarding the status of lead/iron and mercury wastes.
31. E & E Contact Report of September 2, 1992, Christine Caseres of DTSC regarding Molycorp's compliance status.
32. E & E Contact Report of September 4, 1992, Grover Eaton of Molycorp regarding the status of several ponds.
33. Letter from G.H. Duker to Gerard Thibeault regarding closure of Russell's Pond, October 24, 1985.
34. Letter from Robert Sega to Robert S. Dodds regarding closure of Frosty's Overflow Pond, December 11, 1986.
35. Letter from Grover Eaton to Chris Lichens regarding sample data from various ponds, 9/21/92.
36. Molycorp memorandum from John Stribling to Mickey Moran regarding closure of wastewater ponds, 6/26/86.
37. United States Geological Survey, Bulletin 91.

**APPENDIX A**

**CONTACT LOG AND REPORTS**

CONTACT LOG

Facility Name:

Facility ID:

Name	Affiliation	Phone #	Date	Information
Julie Johnson	DTSC	213/590-4980	1/29/92	See Contact Report
Norm Manson	SCAQMD	714/396-2481	1/29/92	"
Chris Collins	San Bernardino APCD	619/243-8920	1/30/92	"
Larita	San Bernardino Health Dept.	714/387-4624	1/30/92	"
Cindy Mitton	RWQCB	619/241-6583	1/31/92	"
Chris Collins	San Bernardino APCD	619/243-8920	2/21/92	"
Grover Eaton Geoff Nason	Molycorp	619/856-2201	3/13/92	See Site Interview and Observation Report
Grover Eaton	Molycorp	619/856-2201	3/23/92	See Contact Report
Jay Cass	RWQCB	619/241-6583	4/1/92	"
Grover Eaton	Molycorp	619/856-2201	8/10/92	See Contact Report
Christine Caseres	DTSC	310/590-5930	9/2/92	See Contact Report
Grover Eaton	Molycorp	619/856-2201	9/4/92	See Contact Report

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Cal EPA		
<b>DEPARTMENT:</b> DTSC		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Julie Johnson	File Room Clerk	213/590-4980
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 1/29/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

The Molycorp file is checked out. Ms. Johnson will contact the person who has the file and call me back.

1/31/92

Ms. Johnson can't give me the name of the Molycorp project officer or who the file is checked out to. She will call me back when she determines when the file will be available for my review.

2/21/92

I left a message for Ms. Johnson to call me.

3/3/92

Ms. Johnson told me that the Project Officer is Christine Caseres (310/590-5950). Ms. Johnson will call me back regarding who has the file.

3/5/92

Ms. Johnson will call me back regarding the availability of the file.



# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> SCAQMD		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Norm Manson		714/396-2481
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 1/29/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

I was referred to the Victorville office of the San Bernardino County Air Pollution Control District regarding Molycorp. SCAQMD has no jurisdiction for "the desert."

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> San Bernardino County Air Pollution Control District		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Chris Collins		619/243-8920
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 1/30/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

Collins is the supervisor of the APCD Engineering section. Requests to review file information should be submitted to Collins. Eldon Heaston (243-8911) is the supervisor of the Toxics Section. Should copy Heaston on the request to review file information.

Collins requested that I be specific in terms of what I want to review and dates. They can copy file information and send it to me or I can review it in person.

APCD recently inspected the Molycorp facility.

1/31/92

Collins is not in today. Jim Lehmann indicated that requests should go through Charles L. Fryxell (234-8920). APCD address is 15428 Civic Drive, Suite 200, Victorville, CA 92392. Fax #: 619/243-8925.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> San Bernardino county Health Department		
<b>DEPARTMENT:</b> Environmental Health		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Larita		714/387-4624
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 1/30/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

Larita will fax me an application to review records. When they receive the application, they'll call me to tell me when I can review the Molycorp files in their office.

2/3/92

Larita indicated that I can review the Molycorp files tomorrow (2/4/92) at 1:30 p.m. at their office in San Bernardino. Address is 385 N. Arrowhead Ave., Second floor. Take 3rd Street exit off I-15, go left at the signal which turns into 4th Street. The building says "Government Center."

2/4/92

The county inspector for Molycorp is Charles Austin in the Victorville office.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> RWQCB		
<b>DEPARTMENT:</b> Lahontan Region		
<b>ADDRESS/CITY:</b> Victorville		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Cindy Mitton		619/241-6583
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 1/31/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

Ms. Mitton is the current Project Officer for Molycorp. She can meet with me at 9:00 a.m. Tuesday morning (2/4/92). There is a copying charge for files. Toxics, and Permitting and Enforcement are two separate sections; Ms. Mitton is in Toxics. Jay Cass in permitting is probably more familiar with the site than Ms. Mitton. There is also a separate monitoring file, and reports in the RWQCB library.

The RWQCB address is 15428 Civic Drive, Suite 200, Victorville, CA 92392. Go to Ontario along I-15 and take the Palmdale Road/Highway 18 offramp at Victorville. Go left onto Palmdale Road and go left at the signal over the freeway. Go right at Kentwood (2nd light after the freeway and then right at Civic.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> San Bernardino APCD		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Chris Collins		619/243-8920
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 2/21/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

Collins requested that I again fax the letter requesting review of Molycorp file information. He also requested 10 days notice before I actually review the files.

3/3/92

I set up an appointment to review the Molycorp files on March 12, 1992, at 2:00 p.m.

# **SITE RECONNAISSANCE INTERVIEW AND OBSERVATIONS REPORT**

Ecology and Environment, Inc.		
160 Spear Street, Suite 1400		
San Francisco, California 94105		
(415) 777-2811		
E & E PERSON(S) CONDUCTING INTERVIEW: Chris Lichens and Paul Cort		
<b>FACILITY REPRESENTATIVE(S):</b>	<b>TITLE:</b>	<b>PHONE:</b>
Grover Eaton	Chief Engineer	619/856-2201
Geoffrey Nason	Resident Geologist	619/856-2201
<b>SITE NAME:</b> Molycorp		<b>DATE:</b> 3/13/92
<b>CITY/STATE:</b> Mountain Pass/California		<b>EPA ID#:</b> CAD009539321

## **The following information was obtained during the interview:**

Mine overburden is taken to an area on the west side of the property. Nominally 450,000 tons of ore and 2.6 million tons of waste rock will be generated in 1992. The mineral which is mined from the ore is called Bastnasite. Initially, on-site processing took place entirely at the flotation plant. In approximately 1964, the Chemical Plant was built to produce europium. The barrel storage area (hazardous waste storage area) was initially used in 1984. Before 1984, lead-iron removal thickener was pumped to a surface impoundment, which will be closed in place in 1995 or 1996.

At the Crusher and Flotation Plant, rock is crushed to one-half inch diameter particles at the primary crusher, then reduced to 100 mesh at the ball mill after the addition of reclaimed water. Flotation reagents soda ash, and steam are added in conditioner tanks. Approximately 2,000 tons of ore per day are processed through the flotation plant. Of this 2,000 tons, approximately 150 tons reports as concentrate and the remaining 1,850 tons becomes tailings. Wastes from the Crusher and Flotation Plant include overburden, tailings, wastewater used to transport tailings, and gear lubricant which is sent off-site for recycling.

Approximately 55 gallons per month of waste gear lubricant are generated and stored with other waste oils in the hazardous waste storage area. An unused tailings impoundment is scheduled for closure

in 1994 through the Lahontan RWQCB. A second impoundment is currently being used.

The chemical plant accepts 60% Bastrasite concentrate from the Crusher and Flotation Plant, which is fed to a roaster to convert cerium carbonate to cerium oxide and burn off other carbonate materials. Effluent is discharged to a baghouse; emissions are carbon dioxide and water. A leach step adds HCl and chilled water to dissolve non-cerium lanthanides from cerium. The cerium liquid is thickened, filtered and dried, then packaged as low-grade or high-grade cerium. Water is sent to the wastewater treatment system. Ammonia is added to the liquid fraction of the thickener to precipitate out iron. Lead is also precipitated out, followed by additional thickening and filtration. Lead and iron residues from filtration are drummed and sent to the hazardous waste storage area. The liquid from filtration goes through solvent extraction tanks which separate lighter material (raffinate) from heavier material (pregnant liquor). Lights go either to the  $\text{NdCl}_3$  or Nd-Pd concentrate streams where they are precipitated, or to a lanthanum chlorohydrate precipitation step where they are subsequently thickened, washed and dried. Heavies are separated into a Sm, Gd, and heavy LnO stream and a Europium product stream. Wastes from the Chemical Plant include "Sx Crud," zinc, lubricants and other oily wastes, and wastewater. Sx crud is generated in the solvent extraction process and contains various volatile organics and other hydrocarbons. Approximately 20 to 25 drums of Sx crud and 10 to 25 drums of zinc are generated per year.

In the 96 Cerium Plant cerium carbonate is passed through an additional leach step to bring cerium into solution. After the pH is adjusted and flocculant is added, the clarified liquid is passed through a lead removal and precipitation step, followed by filtration and drying. Wastes from the 96 Cerium plant include barium sulfate from a residue filter which goes to the tailings pond.

Prior to 1992 MolyCorp operated a Separation Plant which generated ammonium nitrate and zinc wastes. The RWQCB determined that these wastes are not hazardous.

A wastewater neutralization plant treats all liquid wastes streams generated at MolyCorp. Treatment consists of pH adjustment through  $\text{NH}_3$  injection and formation of different precipitates. The treatment plant underflow goes to the flotation plant for reprocessing and the overflow goes to evaporation ponds.

Three reportable spills have occurred at MolyCorp in the last 18 months. All spills are tracked internally. MolyCorp has used three Underground Storage Tanks since the early 1970s. Two contain diesel and one contains unleaded gasoline. In addition, a Mobil station under lease to MolyCorp removed USTs in 1985. One waste oil tank was abandoned in place.

**The following observations were made during the facility tour:**

Molycorp is located in the desert, approximately 60 miles southwest of Las Vegas, with no nearby populations. A security guard restricts site access to authorized personnel. E & E field team members were given a tour of the mining and processing areas on-site with the exception of the 96 Cerium Plant. Molycorp indicated that on-site FIT testing would be required to see the 96 Cerium Plant because of the potential for ammonia releases. Molycorp also requested that no pictures be taken in the processing areas.

In the hazardous waste storage area, Molycorp personnel indicated that all non lead and iron waste is stored in the southwest corner. The entire hazardous waste storage area encompasses approximately 12,000 square feet. Mercury residue from excavated pipes and soil was noted in the hazardous waste storage area. Molycorp indicated that they could not find a TSD facility that could accept the mercury waste. The use of mercury at Molycorp was discontinued in 1983.  $BaCl_2$  was stored in bags in the same area as the mercury waste. A tailings seepage pond was noted to the southwest of the hazardous waste storage area.

Used motor oil, hydraulic oil and crushed filters are recycled off-site according to Molycorp.



# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Molycorp		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Grover Eaton		619/856-2201
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 3/23/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

- o The Separation Plant closed in December 1991.
- o The 96 Cerium Plant is discussed in the Hazardous Material Business Plan.
- o Lubricants and oily wastes from the Chemical Plant include oily rags and floor sweep oil. 8-12 drums per month are stored in the hazardous waste storage area and transported off-site after 60-90 days.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> RWQCB		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b> Victorville		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Jay Cass		619/241-6583
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 4/1/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

Mr. Cass indicated the following in response to my questions:

- o The groundwater contaminant plume at Molycorp (primarily TDS) was caused by leaking ponds.
- o P1, P16 and the lead ponds (P8, P11 and P24) are of primary concern to the RWQCB.
- o P1 and P16 are known to be leaking.
- o The RWQCB wants to monitor for leakage at P2, P4, the Mill Pond, P7 and P10.
- o P28 A and C are new ponds with synthetic liners and a vadose zone monitoring system.
- o The two seepage collection ponds downgradient from P16 are also of concern to the RWQCB.
- o Rich Hubble at DTSC has been doing field work for Christine Caseres.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Molycorp		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Grover Eaton	Chief Engineer	619/856-2201
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Chris Lichens		<b>DATE:</b> 8/10/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

In response to my questions Mr. Eaton provided the following information:

- o The status of the lead and iron wastes is still pending. EPA has not yet made their decision regarding the beneficiation/processing issue, subsequent to Molycorp's most recent appeal.
- o The mercury waste currently being stored in the hazardous waste storage area was found in residue from an old drain trench. An on-site europium processing operation formerly used a mercury/zinc amalgum. The mercury from this process was transported off-site for recovery although Mr. Eaton could not recall who recovered it. The last time mercury was transported off-site was approximately 1977.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> DTSC		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Christine Casers		310/590-5930
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b>		<b>DATE:</b> 9/2/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

In response to my questions regarding Molycorp Ms. Caseres provided the following information:

- o DTSC is still in the proces of finalizing their settlement with Molycorp regarding disposition of lead and iron wastes.
- o EPA has not made a determination on the beneficiation/processing issue regarding the lead and iron wastes.
- o DTSC initially inspected Molycorp in 1985. Ms. Caseres inspected Molycorp in January 1991, but DTSC has no regular inspection program.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Molycorp		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b>		
<b>COUNTY/STATE/ZIP:</b>		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Grover Eaton		619/856-2201
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b>		<b>DATE:</b> 9/4/92
<b>SUBJECT:</b>		
<b>SITE NAME:</b> Molycorp		<b>EPA ID#:</b>

In response to my questions Mr. Eaton provided the following information:

- o The "Leach Thick O'Flow" pond contains waste from a mill operation which leached bastnasite concentrate to remove Calcium Carbonate and Strontium Carbonate. The liquid effluent from this process had low levels of lead which were precipitated as carbonate and discharged to the pond. The pond will be closed in 1993; its use was discontinued in 1989. It was initially used in the mid-1960s. The surface area is approximately 150 feet by 150 feet. It has a membrane (hypalon) liner. No sampling has been done yet but probably will be done through closure.
- o The reagent spillage pond has been determined to have elevated hydrocarbon levels and low level levels.
- o The wastewater ponds have lead at background levels.

Grover will send me data on these ponds, as well as the surge pond and wastewater neutralization plant.

**APPENDIX B**

**PHOTODOCUMENTATION**

FIELD PHOTOGRAPHY LOG SHEET

DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

South

WEATHER:

Clear, 70°

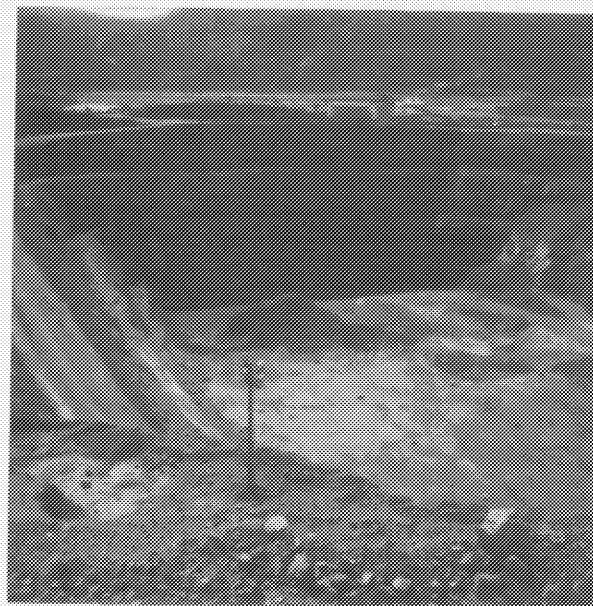
PHOTOGRAPHED BY:

G. Nason (Molycorp)

SAMPLE ID#:

NA

DESCRIPTION: Ore body - Greenish liquid due to algae.



DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

Southwest

WEATHER:

Clear, 70°

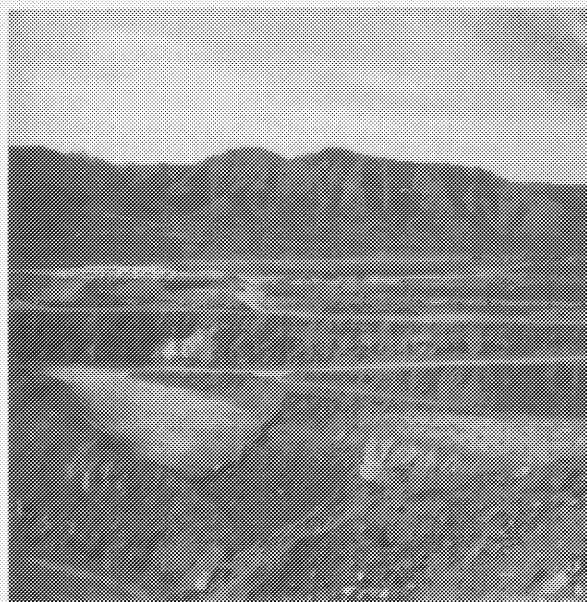
PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Inactive tailings pond (background).



FIELD PHOTOGRAPHY LOG SHEET

DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

Southeast

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Overburden area.



DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

East

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Overburden area.





FIELD PHOTOGRAPHY LOG SHEET

DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

West

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Overburden area.



DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

South

WEATHER:

Clear, 70°

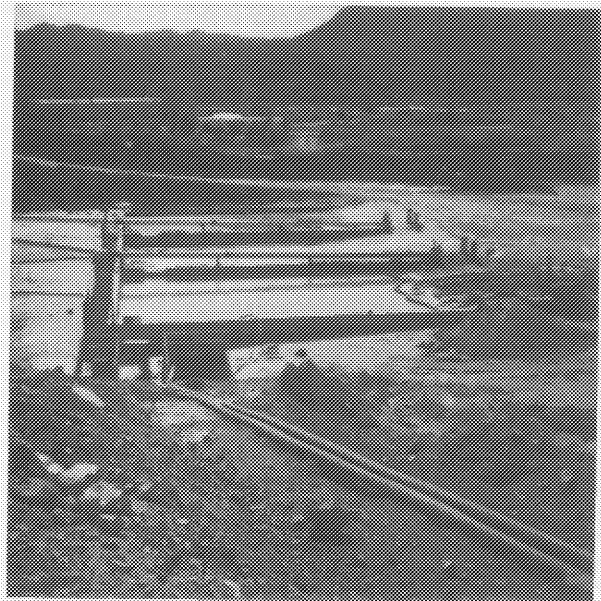
PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Mill containment system.



# FIELD PHOTOGRAPHY LOC SHEET

DATE: 3-13-97

TIME: 0800

DEPOSITION:

DEPT:

WEATHER:

CLOUD: 100%

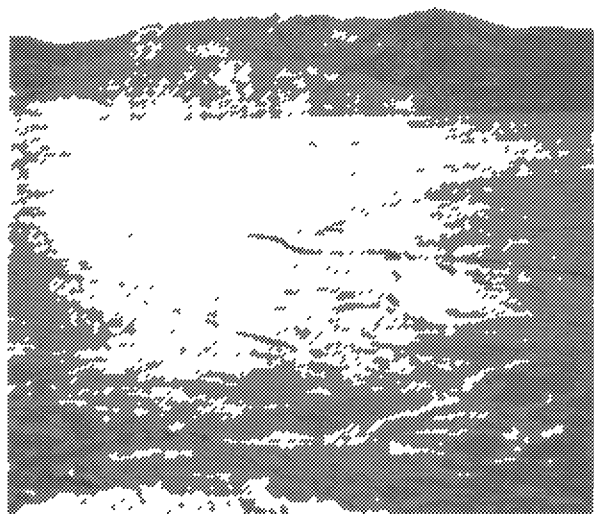
PHOTOGRAPHER: B.L.

G. Nason

SAMPLE ID#:

LA

DESCRIPTION: 16' high sand.



DATE: 3-13-97

TIME: 0800

DEPOSITION:

WEATHER:

CLOUD: 70%

PHOTOGRAPHER: B.L.

G. Nason

SAMPLE ID#:

W

DESCRIPTION: Pylon of chemical plant.



# FIELD PHOTOGRAPHY LOG SHEET

DATE: 01/11/92

TIME: 08:00

PRECIPIT:

WIND:

WEATHER:

Clear, 70°

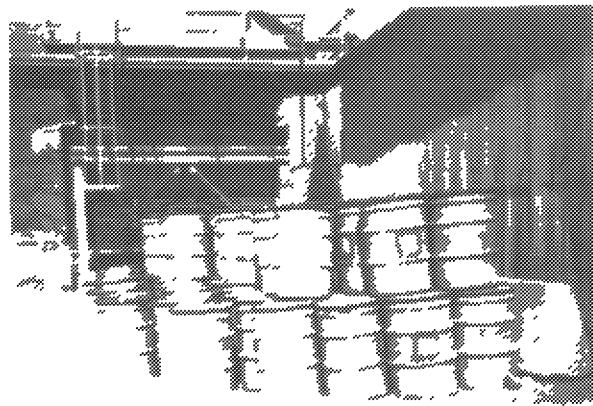
PHOTOGRAPHER:

G. Mason

SAMPLE ID:

N2

DESCRIPTION: Lead-acid filter cake before transport to hazardous waste storage area.



DATE: 01/13/92

TIME: 08:00

PRECIPIT:

WIND:

WEATHER:

Clear, 70°

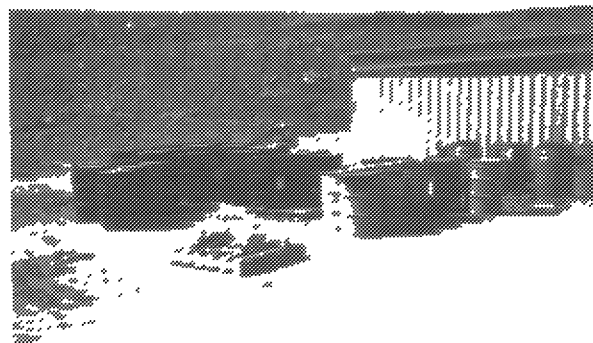
PHOTOGRAPHER:

G. Mason

SAMPLE ID:

N3

DESCRIPTION: Empty acid storage across from hazardous waste filter cake storage (previous picture).



FIELD PHOTOGRAPHY LOG SHEET

DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Lead/iron filter cake accumulation.



DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

WEATHER:

Clear, 70°

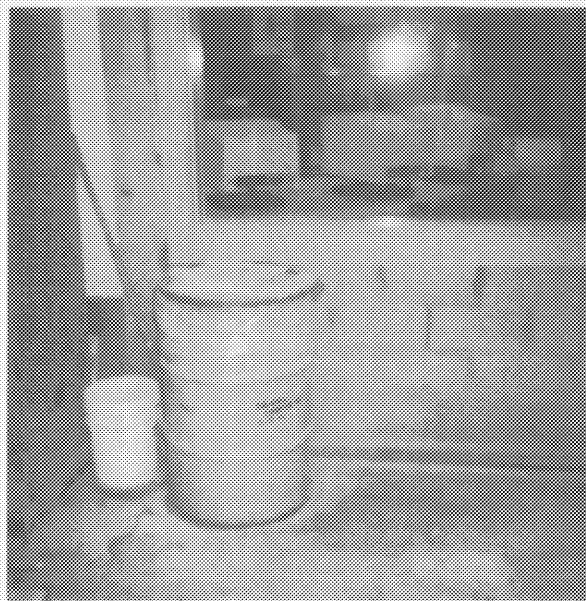
PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: "Sx crud" storage prior to transport to hazardous waste storage area.



FIELD PHOTOGRAPHY LOG SHEET

DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Area rinsing which drains to sump which is recycled to recover product.



DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

South/southwest

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Hazardous waste storage area.



# FIELD PHOTOGRAPHY LOG SHEET

DATE: 3/1/92

TIME: AM

DIRECTION:

Compass:

WEATHER:

Cloud: 70%

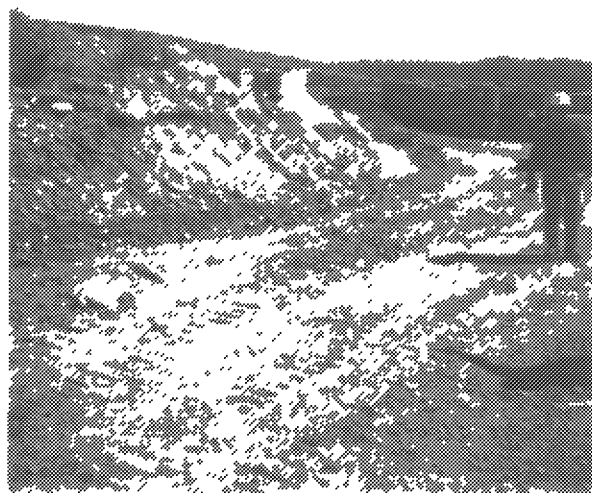
PHOTOGRAPHED BY:

C. Mason

SAMPLE ID#:

NA

DESCRIPTION: Deeply eroded tailings pond. Hardly any water storage at all.



DATE: 3/1/92

TIME: AM

DIRECTION:

Wind:

WEATHER:

Cloud: 70%

PHOTOGRAPHED BY:

C. Mason

SAMPLE ID#:

NA

DESCRIPTION: No. 1, storage (left) and processing section (right)





FIELD PHOTOGRAPHY LOG SHEET

DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

North

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Lignin sulfate in ditch adjacent to barrel storage  
(Hazardous waste storage area).



DATE: 3/13/92

TIME: \_\_\_\_\_ AM

DIRECTION:

WEATHER:

Clear, 70°

PHOTOGRAPHED BY:

G. Nason

SAMPLE ID#:

NA

DESCRIPTION: Tailings seepage pond.



12 18

**DOCUMENT SOURCE**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. 81-73  
(Revised January 14, 1985)

FOR

MOLYCORP, INC.  
MOUNTAIN PASS MINE  
San Bernardino County

\_\_\_\_ DOHS

\_\_\_\_ X RWQCB

\_\_\_\_ OTHER

DATE 3/20/85

FLOW MONITORING

The total monthly flow (million gallons or cubic meters) shall be measured and recorded for the following:

1. Wastewater flow discharged to tailing ponds.
2. Tailings pond wastewater pumped to mill for reuse.
3. Water pumped from Mexican Well to collection/surge pond.
4. Wastewater discharged to Ivanpah evaporation ponds. Record and report both upper and lower flow meter readings (monthly flow volumes).
5. The total of any other discharges of mill or chemical plant origin which are not transported to the collection/surge pond but are released to the drainage basin tributary to Mexican Well (Wheaton Wash groundwater barriers).

EFFLUENT MONITORING

Grab samples from the discharge line to the Ivanpah evaporation ponds shall be collected and analyzed as follows:

<u>PARAMETERS</u>	<u>UNITS</u>	<u>SAMPLING FREQUENCY</u>
Total Filtrable Residue	mg/l	Quarterly
Chloride	mg/l	Quarterly
Sulfate	mg/l	Quarterly
Calcium	mg/l	Quarterly
Sodium	mg/l	Quarterly
Magnesium	mg/l	Quarterly
Nitrate (as N)	mg/l	Quarterly
Strontium	mg/l	Quarterly
Electrical Conductivity	micromhos/cm	Quarterly
pH	pH units	Quarterly
Temperature	°F or °C	Quarterly

Ref. # 1



#### IVANPAH EVAPORATION POND MONITORING

Equal volume grab samples shall be collected in June of each year from each evaporation pond. These samples shall be combined into one sample for analysis to determine the magnitude of the same parameters required for effluent monitoring.

#### IVANPAH EVAPORATION POND GROUNDWATER MONITORING

The depth to groundwater in the four groundwater monitoring wells located adjacent to the evaporation ponds shall be measured and recorded quarterly. Samples of the top 15 feet (4.6 m) of groundwater shall be collected quarterly<sup>a/</sup> from each monitoring well and analyzed to determine the magnitude of the same parameters required for effluent monitoring.

The velocity and direction of groundwater flow under the evaporation pond shall also be determined quarterly unless it can be shown that no changes in velocity or direction will occur.

#### SAMPLING PROGRAM

A groundwater monitoring and sampling program shall be prepared by MolyCorp, Inc. which includes procedures and techniques for: sample collection, sample preservation and shipment, analytical procedures, and chain of custody control. The program shall be submitted with the first monitoring report due March 15, 1985. An updated monitoring and sampling program shall be submitted whenever changes to the program are implemented.

#### STATISTICAL ANALYSIS

After water quality protection standards based on background water quality have been established by the Regional Board, the statistical procedures specified in Section 2555(h), Subchapter 15, Chapter 3, Title 23, California Administrative Code or an alternative procedure approved by the Executive Officer, shall be used by MolyCorp, Inc. to determine if water quality protection standards have been exceeded by a statistically significant amount.

---

<sup>a/</sup> Collection and analysis of samples shall be performed monthly for the first four (4) consecutive months and then quarterly thereafter. In addition, samples of the groundwater from the upgradient monitoring well shall be collected and analyzed at weekly intervals [four (4) per month] for the first four (4) consecutive months to establish background water quality.

MOLYCORP, INC.  
MOUNTAIN PASS MINE  
San Bernardino County

- 3 -

MONITORING AND REPORTING  
PROGRAM NO. 81-73  
(Revised January 14, 1985)

#### WHEATON WASH GROUNDWATER

Four groundwater monitoring wells designated "B" through "E" have been established by MolyCorp, Inc. within Wheaton Wash. These four monitoring wells are acceptable to the Executive Officer for compliance sampling. Wells "B", "C", "E", and "Mexican Well" shall be sampled and laboratory analyses performed on these samples as follows:

<u>PARAMETER</u>	<u>UNITS</u>	<u>FREQUENCY</u>
Electrical Conductivity	micromhos/cm	Monthly
Temperature	°F or °C	Monthly
pH	pH Units	Monthly
Total Filtrable Residue	mg/l	Monthly
Chloride	mg/l	Monthly
Calcium	mg/l	Monthly
Sulfate	mg/l	Quarterly
Sodium	mg/l	Quarterly
Magnesium	mg/l	Quarterly
Nitrate (as N)	mg/l-N	Quarterly
Strontium	mg/l	Quarterly

#### SUPPLY WATER MONITORING

Semiannual grab samples of freshwater supplied to the MolyCorp, Inc. Mountain Pass Operation are to be collected and analyzed to determine the magnitude of the same parameters required for effluent monitoring.

#### OPERATION AND MAINTENANCE

A brief summary of any operational problems and maintenance activities shall be submitted to the Regional Board with each monitoring report.

This summary shall discuss:

1. Any modifications or additions to the wastewater conveyance system, treatment facilities, or disposal facilities.
2. Any major maintenance conducted on the waterwater conveyance system, treatment facilities, or disposal facilities.
3. Any major problems occurring in the wastewater conveyance system, treatment facilities, or disposal facilities.
4. The calibration of any measuring devices.

MOLYCORP, INC.  
MOUNTAIN PASS MINE  
San Bernardino County

- 4 -

MONITORING AND REPORTING  
PROGRAM NO. 81-73  
(Revised January 14, 1985)

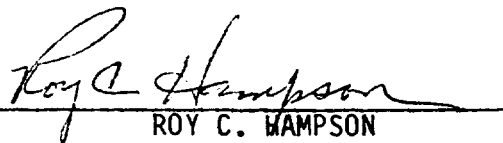
ANALYSES OF SAMPLES

All analyses shall be performed in accordance with the current edition of Standard Methods for the Examination of Water and Wastewater and in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Executive Officer.

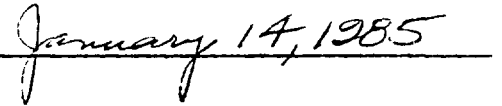
REPORTING

Monthly monitoring reports including the preceding information shall be submitted to the Regional Board by the 15th day of the following month. The first report is due March 15, 1985.

Ordered by:

  
ROY C. WAMPSON  
EXECUTIVE OFFICER

Dated:

  
January 14, 1985

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

BOARD ORDER NO. 6-91-836  
WDID NO. 6B362098001

REVISED WASTE DISCHARGE REQUIREMENTS

FOR

MOLYCORP, INC.  
MOUNTAIN PASS MINE AND MILL OPERATIONS

San Bernardino County

---

The California Regional Water Quality Control Board, Lahontan Region, finds:

1. Discharger

On April 15, 1986, Molycorp, Inc. submitted a report of waste discharge for mining and mill processing at the Mountain Pass Operations as required by the November 1984 revisions to Chapter 15, Title 23, Cal. Code of Regs. (hereinafter Chapter 15). Subsequently, many technical reports have been submitted, including a Hydrogeological Assessment Report (HAR) as required by the Toxics Pit Cleanup Act of 1984, Section 25208, California Health and Safety Code (hereinafter TPCA). Molycorp, Inc. is hereinafter referred to as the "discharger."

2. Project Location

The project is located north of Interstate 15 about 15 miles southwest of the Nevada state line at Mountain Pass and straddles the boundary between the Ivanpah Hydrologic Unit and the Shadow Hydrologic Subarea of the Silurian Hills Hydrologic Area of the Amargosa Hydrologic Unit, within Sections 11,12,13, and 14, T16N, R13E, SBB&M as shown on Attachments "A," and "B."

3. Project Description

The Molycorp operations began in 1950 in the Mountain Pass area. Molycorp, Inc. operates an open pit lanthanide mine with milling, beneficiation, and processing facilities. The three major milling plants are the flotation plant, chemical plant, and separation plant. Mine wastewaters were disposed to percolation ponds onsite until 1980 causing degradation of underlying ground waters. Most mine wastewater currently is collected from various discharge points at the mill site and disposed to a 100-acre evaporation pond located on Ivanpah Dry Lake about 13 miles to the east. Mine waste overburden is stockpiled on site. Numerous process water, tailings and product storage ponds still exist at the millsite. For purposes of this Order, the entire Mountain Pass mine and mill operation is referred to as the "project" with the exception of those items listed in Findings No. 4.b. (Permit History) and 10 (Other Wastestreams).

Ref. #8

#### 4. Permit History

- a. The Board previously established waste discharge requirements for this project under the following:
  - (1) On September 19, 1981, Board Order No. 6-81-73 was adopted for the Mountain Pass Operations. That Order is superseded by this Order.
- b. The Board previously established waste discharge requirements for the disposal of wastewater from the mill and contaminated ground water extraction at the mill area under the following:
  - (1) On June 14, 1990, Board Order No. 6-90-41 was adopted for the New Ivanpah Dry Lake Wastewater Evaporation Ponds.
  - (2) On September 13, 1990, Board Order No. 6-90-56 was adopted for the closure of the Old Ivanpah Dry Lake Wastewater Evaporation Ponds.
  - (3) Board Orders (Numbers 6-90-41 and 6-90-56) remain in effect.

#### 5. Reason for Action

The Board is revising waste discharge requirements to reflect the 1984 revisions to Chapter 15, include modifications to the discharger's waste management strategy, and incorporate provisions for a contaminated ground water corrective action plan.

#### 6. Site Geology

The project is located in a saddleback pass between the Clark Mountains and the Ivanpah Mountains. A complex series of thrust faults have produced the ore deposit that is mined. The primary mineral, bastnasite, containing many of the lanthanide series of elements, is called an "intrusive igneous carbonate mass," and was produced from volcanic activity. Rock types can be broken into three groups; metamorphosed granite gneisses and granite intrusions, sediments composed predominantly of limestone and dolomite, and young and old alluvium consisting of clay, silt, gravel, cobbles, and boulders up to 12 feet in diameter.

#### 7. Site Hydrology

The granites and carbonates, generally, are intruded by andesite dikes, and are sufficiently faulted and fractured such that the hydraulic conductivity of the bedrock is estimated to be  $1 \times 10^{-3}$  cm/s. The "water bearing unit" beneath the site is the younger alluvial materials, with some minor production from the fractured bedrock. The ground water flow direction is generally from north to south under the site, splitting, with an eastern component down Wheaton Wash towards Ivanpah Dry Lake and

a western component down the Western Gap towards the Shadow Valley. A ground water mound has developed under the main tailings pond (P-16) and a cone of depression has developed from mine pit dewatering. Both have influenced the ground water flow patterns. An ancient alluvial filled subterranean canyon exists, somewhat parallel to Interstate 15, that may influence deep ground water flow. The background water quality is relatively good with total dissolved solids (TDS) of 300 to 900 mg/l, neutral pH, and heavy metals near detection limits. Industrial supply water for the Mountain Pass Operations comes from wells located in the Ivanpah Valley to the east and the Shadow Valley to the west.

8. Contaminated Ground Water

Past wastewater disposal practices have polluted the ground water at the mill site. MolyCorp has installed a number of "interceptor" wells in the Wheaton Wash downstream of the mine site. A continuous ground water extraction program in Wheaton Wash has been in existence since 1980. Ground water dewatering in the Western Gap wash, which drains to the west from the mine site began in 1988. A similar ground water extraction system has been proposed for the Farmers Wash, which drains to the east from the mine site. The mine pit dewatering well was redrilled in 1990 due to pit expansion and maintains water levels below mining activity. Hydrogeologic reports indicate that the pit dewatering well may act as an interceptor well for contaminated ground water flowing from under the main tailings pond (P-16) to the southwest. This Order requires the discharger to develop a detailed ground water Corrective Action plan and submit annual reviews.

9. Waste Stream and Management Unit Description

A description of the waste streams disposed at the mill site and the associated waste management unit's regulated by this Order are as follows:

a. Overburden

Approximately 10,000 tons/day of overburden and waste rock are generated from the open pit mine. This material is disposed of to the northwest of the open pit.

b. Flotation Plant Effluent to Main Tailings Pond (P-16)

- (1) After crushing, ore is sent to the flotation plant. About 2,500 dry tons/day of waste (7,000 to 17,000 tons per day of slurry) goes to the main tailings pond (P-16) from the flotation circuit in the Cerium "96" plant.
- (2) Chemicals used in the flotation process are soda ash, lignin sulfonate (a dispersant), and commercial fatty acids such as oleic acid and maleic acid.

- (3) The liquid portion of the slurry is evaporated, percolated through the impoundment to ground waters or returned to the mill for reuse.
- (4) Data collected and analyzed by Molycorp between 1974 and 1985 indicated the liquid portion of the slurry contains 7,700 mg/l total dissolved solids (TDS), 1.4 mg/l lead (Pb), 308 mg/l nitrate ( $\text{NO}_3$ ), 20 mg/l barium (Ba), and 1,200 mg/l sulfate ( $\text{SO}_4$ ). Total metal concentrations are comprised in part of 10,000 mg/kg Ba, 250 mg/kg copper (Cu), and 1,000 mg/kg Pb. The pH range of the slurry is 7 to 9.
- (5) The 40-acre pond has been in operation since 1966.
- (6) Seepage from the unlined pond is estimated to be up to 100 gal/min. The discharger is undertaking a study of the methods used for slurry disposal. A fine tailings deposition plan called "dry stacking" is expected to partially seal the pond.
- (7) On March 10, 1986, the State Department of Health Services issued a determination that the tailings are nonhazardous based on the solubility of lead sulfide in the waste stream at the time of classification.
- (8) Data collected in 1983 indicates that the tailings have a large excess base potential and are not acid generating.

c. Seepage Ponds (P-23 A and B)

Seepage from the tailings pond (P-16) flows downward to ground water and then through the tailings dam into seepage collection ponds (P-23 A & B). From the seepage collection ponds, about 17,000 gpd of water is pumped to the Ivanpah Evaporation Ponds. A grab sample analysis of this water taken in 1990 by Regional Board staff indicates that it contains 550 mg/l nitrate as nitrogen ( $\text{NO}_3$  as N), 7,600 mg/l total dissolved solids (TDS), turbidity of 6.6 NTU, 2.3 mg/l barium (Ba), 1.9 mg/l lead (Pb), 16 mg/l surfactants (MBAS as LAS) and 103 mg/l tannin and lignin compounds as tannic acid. These ponds are unlined as they are designed to intercept ground water flow from the tailings pond.

d. Storm Water Retention Pond (P-20A)

The storm water retention pond is an unlined, 3.2 acre pond used to control 80,000 gallons of storm water runoff from the mill site. The pond has never overflowed to the intermittent stream nearby and is designed to eliminate turbidity and control erosion.

e. Domestic Sewage Pond (P-19)

The domestic sewage pond is an unlined pond with a capacity of 12.5 million gallons, designed to receive 0.25 mgd, but currently receives less than 0.05 mgd. Domestic waste water from the plant goes through a number of septic tanks before being discharged to the pond.

f. Product Storage Ponds

Molycorp, Inc. uses many ponds as product storage ponds. The following ponds may pose a threat to water quality if leaks or spills should occur during use or if they are improperly closed or abandoned:

(1) Mill Containment Pond (P-2)

Some process water, floor wash water, and pump gland seal water from the flotation plant is directed to the concrete lined mill containment pond (P-2). In the event of a power failure, all of the flotation and thickener tanks from the flotation plant are drained onto the floor of the facility to prevent the product from solidifying in the tanks. Both the products and reagents are then discharged to P-2. When power is restored, the products and reagents are pumped back into the mill. The mill containment pond capacity is three million gallons. The mill discharge to this pond averages one million gallons/month and contains in part 6,000 mg/l TDS and 6 mg/l strontium (Sr).

(2) Filter Cake Storage (P-7A&B)

Two contiguous asphalt pads are used for the temporary storage of mill material. Pad 7A is eight (8) feet deep, approximately 29,000 square feet and has a 4 to 6 inch asphalt liner. Pad 7B is four (4) feet deep, approximately 17,600 square feet and has a 4 to 6 inch asphalt liner. Lanthanum hydrate, cerium, and unleached bastnasite ore are cycled in and out of these pads as mill processing requirements dictate.

(3) Product Storage Bins (P-10)

This pond consists of a series of three (3) above ground concrete storage product bins. Each bin is constructed of eight to ten inches of reinforced concrete and is approximately 30 feet square. Various products from the chemical and separations plants are temporarily stored here. When the bins are used as dewatering tanks for a slurry product, the liquid is sent to the Ivanpah Evaporation ponds.



(4) Cerium Product Storage (P-25A)

This pond is an unlined, bermed pond with an asphalt bottom containing cerium and baghouse dust. The existing contents will be processed as saleable products. This pond will be clean closed. A closure plan will be submitted to the Regional Board for approval.

(5) Lanthanum Hydrate Storage (P-25B)

This pond is used for the storage of lanthanum hydrate. Approximately 80,000 to 100,000 gallons per day of slurry is pumped here. The water is decanted and disposed to the Ivanpah Evaporation ponds. The solids will settle and remain in the pond until the market has improved. This pond is equipped with a single 80 mil HDPE liner and has four (4) gypsum blocks beneath the liner and eight (8) gypsum blocks on the perimeter as moisture sensors. The pond is approximately 1.2 acres with a capacity of 3,000,000 gallons.

(6) Molycorp is proposing to construct new pond P-28, similar to P-25B, for lanthanum hydrate storage. The Executive Officer must approve the vadose zone and/or ground water monitoring system for this pond to determine compliance with performance standard I.C.7.

10. Other Wastestreams and Waste Management Units

The following wastestreams and waste management units exist or have existed at the mill site and are not covered by this Order:

a. Old West Tailings Pond (P-1)

This pond will require closure requirements under Chapter 15, Title 23, Cal. Code of Regs. This was the original tailings pond at the mill. Currently it contains all material removed from the "clean closed" ponds. After the other old ponds at the mill site are closed this pond will be closed. This Order requires that a final closure plan be submitted for this pond.

b. Lead Sulfide Ponds (P-8, P-11, and P-24)

These ponds contain lead and iron-bearing wastes from the chemical plant which are of a hazardous nature. They are currently inactive. These ponds will require closure requirements under a separate Board Order if closed in place. This Order requires final closure plans to be submitted for these ponds.

c. Inactive Community Landfill

Northwest of the mill site is a closed landfill that received municipal solid waste during the time a fairly large trailer park was operated at the mine. It became inactive in 1987 and is on the Solid Waste Assessment Test (SWAT) list, Rank 6 which requires a report by July 1, 1992.

d. Molycorp Solid Waste Landfill

A solid waste disposal area is currently used by Molycorp and is located in an area north and upgradient of P-16. Only domestic waste is placed here. This landfill is listed on Rank 6 of the SWAT which requires a report by July 1, 1992. This landfill is not permitted and a Report of Waste Discharge will be requested. Operating waste discharge requirements and a California Integrated Waste Management Board solid waste permit issued by San Bernardino County are required for this landfill.

e. Wastewater Collection System

This system collects effluent from various points at the mill site and delivers it, through a pipeline, to the New Ivanpah Evaporation Ponds. Also included in this combined waste stream is contaminated groundwater that is extracted as explained in Finding No. 8, (Contaminated Ground water).

f. Chemical Plant Effluent

Concentrates from the flotation plant are further processed in the chemical plant using roasting, hydrochloric acid leaching, thickening, precipitation, and liquid/liquid extraction with kerosene. Wastewater from the chemical plant is discharged to the Ivanpah ponds.

g. Separation Plant Effluent

Concentrates from the chemical plant are further processed in the separations plant using a series of liquid-liquid/ion exchange circuits. The aqueous phases in these circuits are lanthanide-nitrate solutions and the organic phases are a variety of organic solvents including kerosene and cyclosol (a photochemical reactant). About 500,000 gpd of combined wastewater flow from both the separations and chemical plants is discharged to the Ivanpah ponds.

h. Other Ponds

Regional Board staff has previously approved closure plans for the following ponds:

<u>Pond</u>	<u>Closure Plan Submitted</u>	<u>Closure Plan Approved</u>
P-3	January 29, 1990	February 23, 1990
P-4	January 29, 1990	February 23, 1990
P-5	January 29, 1990	February 23, 1990

<u>Pond</u>	<u>Closure Plan Submitted</u>	<u>Closure Plan Approved</u>
P-9	October 24, 1985	March 28, 1986
P-12	August 12, 1986	October 6, 1986
P-13	August 12, 1986	October 6, 1986
P-14	May 20, 1986	July 11, 1986
P-15	February 21, 1990	July 18, 1990
P-18	September 29, 1989	February 23, 1990
P-20B	September 2, 1986	October 6, 1986
P-20C	September 2, 1986	October 6, 1986
P-20E	September 2, 1986	October 6, 1986
P-20F	September 2, 1986	October 6, 1986
P-20G	September 2, 1986	October 6, 1986
P-21/3A	September 2, 1986	October 6, 1986
P-22A	September 2, 1986	October 6, 1986
P-22B	September 2, 1986	October 6, 1986
P-22C	September 2, 1986	October 6, 1986
P-22D	September 2, 1986	October 6, 1986
P-23C	September 2, 1986	October 6, 1986

i. Other wastestreams

Molycorp produces a number of other wastestreams that are regulated by the California Department of Health Services.

11. Waste Classification

- a. The mine overburden is classified as Group C mining waste under Section 2571(b)(3), Chapter 15 because the material is non-acid generating and little leaching over time is expected.
- b. The liquid and slurry material discharged to the disposal ponds or escaping from the product storage ponds regulated by this Order except domestic sewage and storm water, are classified as Group B mining waste under Section 2571(b)(2)(B), Chapter 15 because the waste has characteristics which have contributed to ground water pollution at the site.

## 12. TPCA

On November 4, 1985, the Regional Board notified Molycorp that certain ponds contained hazardous waste and were covered under the Toxic Pits Cleanup Act of 1984 (TPCA), (Health and Safety Code, Section 25208 et. seq.). Pond P-18 was determined to be the only pond currently covered under TPCA.

- a. The Board has reviewed the HAR and application for exemption from the closure requirements (1/2 mile exemption) under Section 25208.4 of the Health and Safety Code for P-18 and granted a closure exemption on November 13, 1987, in Board Order No. 6-87-151, which expires on November 13, 1992.
- b. The Regional Board reviewed the HAR and application for exemption from the retrofitting requirements under Section 25208.5 and the mining waste exemption under Section 25208.13 of the Health and Safety Code for P-18 and denied the exemptions in Board Order No. 6-88-66 on May 12, 1988.
- c. Molycorp installed an above ground surge tank at the mill site to replace P-18. Pond P-18 was removed from service and clean closed in 1990. The contents of P-18 were disposed in P-1, the West Tailings Pond. No ground water contamination attributable to P-18 has been detected.

## 13. Surface Impoundments

### A. Ponds for which closure is complete or anticipated:

<u>Designation</u>	<u>Use</u>	<u>Closure Complete</u>	<u>Closure Planned</u>	<u>Closure Type</u>
P-1 West Tails	Tailings & Wastewater		1992	In Place
P-3 South Pond	Tailings	1990		Clean
P-4 Leach Thick O'flow	Leach Liquor		1991	Clean
P-5 Barite Storage	Barite Product	1990		Clean
P-8 Old Lead Pond	Lead Sulphide		unknown	In Place
P-9 Russell's Pond	Storage Sm/Gd Liquor	1987		Clean
P-11 New Lead Pond	Lead Sulphide		unknown	In Place
P-12 Unlined Pond	Collect Cerium Prod.	1990		Clean
P-13 Unlined Pond	Collect Cerium Prod.	1990		Clean
P-14 Frost's Overflow	Tailings Water	1986		Clean
P-15 Reagent Spillage	Mill Reagents		1991	Clean
P-18 Surge Pond	Waste Management	1990		Clean
P-20B Wastewater		1987		Clean
P-20C Wastewater		1987		Clean
P-20E Wastewater		1987		Clean
P-20F Wastewater		1987		Clean
P-20G Wastewater		1987		Clean
P-21/3A Wastewater		1987		Clean
P-22A Wastewater		1987		Clean
P-22B Wastewater		1987		Clean
P-22C Wastewater		1987		Clean
P-22D Wastewater		1987		Clean
P-23C Tails Seepage	Tailings Water	1987		Clean
P-24 Old Lead Pond	Lead Sulphide		unknown	In Place

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

ORIGINAL

FACT SHEET

ITEM: 5 BOARD ORDER NO. 6-91-836  
WDID NO. 6B362098001

DISCHARGER NAME: Molycorp, Inc.

PROJECT NAME: Mountain Pass Mine and Mill Operations

PROJECT TYPE: Lanthanide mine mill waste disposal and contaminated ground water extraction

LOCATION: Mountain Pass, about eight miles west of Nipton, San Bernardino County  
T16N, R13E, Sections 11, 12, 13 & 14 SBB&M

TYPES OF WASTE: Process wastewaters classified as Group B mining wastes  
Mine overburden classified as Group C mine waste

WASTE MANAGEMENT UNIT CLASSIFICATION: Existing Surface Impoundments and Tailings Ponds receiving Group B mining wastes required to come into compliance with requirements of Chapter 15, Title 23, Cal. Code of Regs.

TREATMENT FACILITIES: Thickener circuit, pH control circuit

DISPOSAL FACILITIES: Evaporation ponds

THRT/COMPLX/PROG: To be determined

PRESENT FLOW: 0.5 mgd

DESIGN FLOW: 0.75 mgd

CEQA COMPLIANCE: Categorical Exemption, Existing Facility

LANDOWNER: Molycorp, Inc.

LAND CONTROLLED BY: Molycorp, Inc.

NEARBY DEVELOPMENT: None

NATURE OF AREA: High desert, basin mountain range

B. Disposal ponds not scheduled for closure:

<u>Designation</u>	<u>Use</u>	<u>Type</u>	<u>Waste Classification</u>
P-16 Main Tailings Pond	Tailings Impoundment	Disposal	Group B Mining Waste
P-19 Sewage Lagoon	Sewage Treatment	Disposal	Domestic
P-20A Stormwater Run Off	Control	Disposal	Stormwater
P-23A,B Seepage Collection	Seepage Collection	Disposal	Group B Mining Waste

C. Product storage ponds not scheduled for closure:

<u>Designation</u>	<u>Use</u>	<u>Type</u>	<u>Classification if spills or leaks occur</u>
P-2 Mill Containment	Product storage after Decanting Liquid	Storage	Group B Mining Waste
P-7A Asphalt Pad	Storage Filter Cake	Storage	Group B Mining Waste
P-7B Asphalt Pad	Storage Filter Cake	Storage	Group B Mining Waste
P-10 Above Ground	Concrete Product Storage After Decanting Liquid	Storage	Group B Mining Waste
P-25A Asphalt Pad	Storage of Dewatered Products	Storage	Group B Mining Waste
P-25B Membrane	Product Storage After Decanting Liquid	Storage	Group B Mining Waste
P-28 Membrane	Product Storage After Decanting Liquid	Storage	Group B Mining Waste

14. Waste Management Unit Classification

- The mine waste rock dumps (overburdens) are classified as existing Waste Piles receiving Group C mining waste under Section 2571, Chapter 15.
- The disposal ponds described in Finding No. 13.b. (Surface Impoundments) except P-19 and P-20A are classified as existing Tailings Ponds and Surface Impoundments receiving Group B mining waste under Section 2571, Chapter 15.
- The product storage ponds described in Finding No. 13.c. are classified as existing Surface Impoundments. Any spills or leaks from the product storage ponds would be classified as Group B mining waste. If it is determined that the product storage ponds are leaking and polluting or threatening to pollute underlying ground water a Report of Waste Discharge under Section 13260 may be requested or an Enforcement Action under Sections 13300 or 13301 of the California Water Code may be issued.

15. Authorized Disposal Sites

The disposal ponds described in Finding No. 13.b. (Surface Impoundments) are the only authorized disposal sites for mine waste waters at the mill site. The authorized disposal sites are on private land owned by Molycorp, Inc.

16. SMARA

Section 2574(c), Chapter 15 requires waste discharge requirements to incorporate relevant provisions of an approved mining and reclamation plan under the Surface Mining and Reclamation Act of 1975 (SMARA). Molycorp is updating the current reclamation plan with San Bernardino County. This Order requires compliance with the water quality related aspects of the currently approved reclamation plan.

17. Water Quality Protection Standards

Section 2552 of Chapter 15 requires that water quality protection standards be established for ground water underlying disposal sites regulated by Chapter 15. This Order requires that background water quality be established for constituents listed in Discharge Specification I.B.1.c., when sufficient ground water data has been collected as specified in Section 2595(g)(6) and (7) of Chapter 15. The Regional Board may establish water quality protection standards at a later date.

18. Basin Plan

The Board adopted a Water Quality Control Plan (Basin Plan) for the South Lahontan Basin on May 8, 1975. This Order implements the Plan as amended.

19. Beneficial Uses

a. The present and potential beneficial uses of the ground waters of the Ivanpah Hydrologic Unit as set forth and defined in the Basin Plan are:

- (1) municipal and domestic supply
- (2) agricultural supply
- (3) industrial service supply
- (4) freshwater replenishment

b. The present and potential beneficial uses of the ground waters of the Silurian Hills (formerly Valjean) Hydrologic Area of the Amargosa Hydrologic Unit as set forth and defined in the Basin Plan are:

- (1) municipal and domestic supply
- (2) agricultural supply
- (3) freshwater replenishment

Note, that as described in Finding No. 7, (Site Hydrology), the Molycorp mine and mill site straddles the water shed between these two hydrologic units and that industrial service water supply wells are located in the Shadow Valley to the west within the Amargosa Hydrologic Unit.

20. CEQA Compliance

The MolyCorp, Inc., Mountain Pass facility consists of the continued operation of the existing facilities and as such is exempt from the provisions of the California Environmental Quality Act (CEQA) in accordance with Section 15301, Title 14, Cal. Code of Regs.

21. Mining Waste Management Strategy

Section 13263.1 of the Water Code requires the Regional Board to determine that the mining waste discharge is consistent with a waste management strategy that prevents pollution or contamination of waters of the state, particularly after closure of the mining waste management unit. Principle elements of this plan are:

- a. regulation of the project by the Regional Board including:
  - (1) adoption of waste discharge requirements;
  - (2) a monitoring and reporting program to verify compliance;
  - (3) the development of a closure and post-closure plan for all waste management units;
- b. inclusion of time schedules for the following immediately identified activities:
  - (1) stopping or controlling seepage from the main tailings pond (P-16) or the pond shall be closed or retrofitted (including engineered alternatives) to meet Chapter 15 criteria;
  - (2) development of a detailed contaminated ground water remediation plan; and
- c. a requirement that the discharger develop a detailed waste management strategy for the entire mine and mill site;

22. Notification of Interested Parties

The Board has notified the discharger and all known interested agencies and persons of its intent to issue revised waste discharge requirements.

23. Consideration of Comments

The Board has, in a public meeting, heard and considered all comments pertaining to the discharges.



IT IS HEREBY ORDERED that the discharger shall comply with the following:

I. DISCHARGE SPECIFICATIONS

A. Effluent Limitations

1. All domestic sewage and industrial wastewater made available for percolation shall have a pH of not less than 6 pH units nor more than 9 pH units.
2. All domestic sewage and industrial wastewater made available for percolation shall have a dissolved oxygen concentration of not less than 1.0 mg/l.
3. All domestic sewage and industrial wastewater made available for percolation shall have an average concentration for methylene blue active substances (MBAS) of not more than 1.0 mg/l and a maximum concentration for MBAS of not more than 2.0 mg/l.

B. Receiving Water Limitations

1. In accordance with the time schedules established herein, the discharge of waste shall not cause the presence of the following substances or conditions in the ground waters, or surface waters when present, of the Ivanpah or Amargosa Hydrologic Units:
  - a. any perceptible color, odor, taste or foaming;
  - b. any toxic substances in concentrations that individually, collectively, or cumulatively cause detrimental physiological responses in humans, plants, animals, or aquatic life.
  - c. any of the following indicator parameters in concentrations that exceed background water quality:
    - (1) lead (Pb)
    - (2) barium (Ba)
    - (3) strontium (Sr)
    - (4) chemical oxygen demand (COD)
    - (5) nitrate nitrogen (NO<sub>3</sub> as N)
    - (6) total dissolved solids (TDS)
    - (7) methylene blue active substances (MBAS)
    - (8) pH

C. General Requirements and Prohibitions

1. The discharge of wastewater except to the authorized disposal sites is prohibited.

2. There shall be no discharge, bypass, or diversion of wastewater from the collection, transport, treatment or disposal facilities to adjacent land areas or surface waters except for storm water runoff that meets state and federal requirements. Surface flow or visible discharge of wastewater to adjacent land areas or surface waters is prohibited.
3. The discharge of waste to the surface impoundments shall be limited to that waste described in Finding No. 9, (Waste Stream and Management Unit Description). Any additions to the waste stream shall be reviewed by the Executive Officer to determine if these waste discharge requirements must be revised to incorporate the waste stream.
4. The various discharges to any active, inactive, or closed surface impoundments described in Finding No. 13 (Surface Impoundments) shall not cause a nuisance or pollution as defined in Section 13050 of the Calif. Water Code or a threatened pollution.
5. All surface impoundments described in Finding No. 13.b. (Surface Impoundments) shall be brought into compliance with the requirements of Section 2572, (Siting and Construction Requirements) and Section 2574 (Monitoring Requirements), Article 7, Chapter 15, Cal. Code of Regs for Group B mining wastes.
6. Ground water monitoring wells must be properly constructed, developed and abandoned as defined in Department of Water Resources Bulletin 74-81, "Water Well Standards: State of California."
7. All surface impoundments, with the exception of those ponds specifically designed for percolation or collection, [P-19 (Sewage Lagoon), P-20A (Stormwater Runoff), and P-23A and B (Seepage Collection)] shall prevent the migration of wastes from the surface impoundment to adjacent geologic materials, the vadose zone, or ground water during use, disposal operations, closure, or the post-closure maintenance period. All surface impoundments shall prevent the migration of wastes to surface waters. This requirement applies to P-16 (Main Tailings Pond) in accordance with the time schedules adopted herein.
8. All facilities used for collection, transport, treatment, or disposal of waste shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of 100 years.
9. The minimum freeboard for any surface impoundment shall be maintained at no less than 2.0 feet.

10. The discharger shall remove and relocate to an authorized disposal site any wastes which are discharged in violation of this Order.
11. The discharge of hazardous waste or any mixture of hazardous and non-hazardous waste into any surface impoundment is prohibited.
12. The generation of hazardous waste due to evaporation in any surface impoundment is prohibited.
13. The discharger shall fully comply with the water quality related aspects of the reclamation plan approved by the lead agency (San Bernardino County) as required by Section 2574 (c), Chapter 15 that incorporates the provisions of the Surface Mining and Reclamation Act, Public Resources Code, Section 2770, et seq.
14. The product storage ponds described in Finding No. 13.c. (Surface Impoundments) shall be retrofitted, as feasible, with vadose monitoring as described in Section 2574 (Monitoring Requirements), Chapter 15, Cal. Code of Regs.
15. If the results of vadose zone monitoring indicate that the ponds described in Finding 13.c. (Surface Impoundments) are leaking a Report of Waste Discharge under Section 13260 of the Cal. Water Code may be requested or an Enforcement Action under Section 13300 or 13301 the Cal. Water Code may be initiated.
16. All closure plans, ground water, and vadose zone monitoring plans requested by this Order shall be prepared by, or under the supervision of, a California registered civil engineer or certified engineering geologist. The updating of these plans may be prepared by or under the supervision of the owner or operator of the facility.

## II. PROVISIONS

1. Board Order No. 6-81-73 is hereby rescinded.
2. Pursuant to Section 13267(b) of the Cal. Water Code, the discharger shall comply with Monitoring and Reporting Program No. 91-836 as specified by the Executive Officer.
3. Pursuant to Section 13267(b) of the Cal. Water Code, if the Monitoring and Reporting Program detects a statistically significant increase in any indicator parameter, the discharger shall notify the Regional Board within seven days, in writing, as required in Section 2556, Chapter 15, "Detection Monitoring Program."

4. If the Detection Monitoring Program indicates a statistically significant increase in any indicator parameter, the discharger shall propose, in writing, within 90 days, as required in Section 2557, Chapter 15, a "Verification Monitoring Program."
5. Molycorp, Inc. is required by this Order to implement a "Corrective Action Program," for the contaminated ground water under the mine and mill site as specified in Section 2558, Chapter 15. The following shall be provided as indicated:

a. January 1, 1992

A ground water and unsaturated zone monitoring and sampling program specifically designed for the monitoring and remediation of contaminated ground water at the site. It shall include the procedures and techniques for: sample collection, sample preservation and shipment, analytical procedures, and chain of custody control. An updated program shall be submitted whenever changes occur. The program shall be implemented as required in the monitoring and reporting program.

b. January 1, 1992

The discharger shall submit a report that proposes a method for establishing background levels of ground water quality in accordance with Section 2552, Chapter 15. The discharger shall also include a time schedule for determining the levels. After review and acceptance by the Executive Officer of the background water quality, the numerical values shall be considered as background levels of the above indicator parameters. Report them as required in the attached Monitoring and Reporting Program. This report shall also propose criteria for determining cleanup levels of contaminated ground water. Final cleanup criteria will be established by the Regional Board.

c. January 1, 1992

The discharger shall submit a report that formalizes a ground water cleanup strategy including, but not limited to:

- (1) a definition of the vertical and areal extent of contamination;
- (2) a description of actions taken to date;
- (3) a proposal for a monitoring program to determine effectiveness;
- (4) a description of the current treatment and disposal procedure, including an evaluation of alternative methods that would effectively use reclaimed water;

(5) recommendations for additional wells that are necessary for extraction or monitoring; and

(6) time schedules for implementation the above.

Upon acceptance by the Executive Officer, implement the ground water cleanup strategy.

6. The discharger shall submit the following for the main tailings pond (P-16):

a. March 15, 1993

Submit a status report on the fine tailings deposition ("dry stacking") pilot plan. If the plan has proven ineffective, include conceptual plans for bringing P-16 into compliance with this Order. Included shall be a preliminary design for a ground and surface water interception system upgradient of the main tailings pond (P-16).

b. January 1, 1995

Submit a status report demonstrating the effectiveness of the fine tailings deposition plan ("dry stacking") for the entire pond (P-16). If the plan has proven ineffective, include detailed plans for bringing P-16 into compliance with this Order.

c. January 1, 1996

Demonstrate full compliance with Discharge Specifications I.C.5 and I.C.7.

7. The discharger shall submit the following concerning conceptual closure and post-closure maintenance activities for all active storage and disposal sites at the Mountain Pass mine and mill site:

a. August 1, 1991

Provide a minimum interim financial assurance for closure of \$1,000,000.

b. May 15, 1992

A conceptual closure plan shall be submitted (sufficient to determine the cost of closure) for the Mountain Pass mine and mill. The conceptual closure plan shall determine the cost of compliance for closure requirements specified in Sections 2574, 2580, 2582 and 2597 of Chapter 15. The essential elements of an approved reclamation plan for SMARA compliance shall be included. The cost for preparation of a final closure plan shall be included. The closure cost

estimate shall be prepared by a California registered civil engineer or certified engineering geologist possessing the qualifications for review. The conceptual plan shall be prepared for a period of five (5) years in the future. It shall contain "worst case" and "normal closure" scenarios. Financial assurance provided to the Regional Board shall be for the "worst case" scenario. The cost estimates must be detailed line item costs and encompass all closure activities. Justifications and references for the cost estimates must be provided. Any construction index that is used must be referenced.

c. June 15, 1992

The discharger shall provide written assurance, in a manner acceptable to the Board, that an irrevocable closure fund has been established, to ensure closure and post-closure maintenance of the project in accordance with an approved closure plan.

d. July 1, 1996 and every five (5) years thereafter

The discharger shall update the conceptual closure cost estimates for an additional five (5) year period. After review by the Executive Officer an updated financial assurance document shall be provided in accordance with existing Regional Board Policy.

8. The conceptual closure and post-closure maintenance plan submitted pursuant to the above provisions shall be updated if there is a substantial change in operations. A final plan shall be submitted at least 180 days prior to beginning any partial or final closure activities or at least 120 days prior to discontinuing the use of the site for waste treatment, storage, or disposal, whichever is greater.

9. The discharger shall submit the following concerning final closure and post-closure maintenance activities at the Mountain Pass mine and mill site:

a. June 1, 1993

submit a final plan for activities necessary to close and conduct post-closure monitoring at the Old West Tailings Pond (P-1). Include a time schedule for closure activities at the site.

b. June 1, 1994

submit a final plan for activities necessary to close and conduct post-closure monitoring at the Lead Sulphide Ponds (P-8,11,&24). Include a time schedule for closure activities at the site.

Upon approval by the Executive Officer implement the closure activities at the above sites.

10. The discharger shall submit a report describing a waste management strategy as described in Section 13263.1 of the California Water Code. As a minimum the strategy shall include:

a. May 15, 1992

A wastewater control plan shall be submitted that will detail the activities necessary to ensure no liquid hazardous wastes are discharged to the surface impoundments or generated in the surface impoundments by the evaporation of wastewaters.

b. May 15, 1992

A description of those activities necessary to prevent pollution or contamination of waters of the state, particularly after closure of any waste management unit.

c. May 15, 1992

A report on those surface impoundments described in Finding No. 13 (Surface Impoundments), except for those ponds described in Provision No. 10, above, including but not limited to the following:

- (1) Characterization of the wastes each surface impoundment received during its time in service;
- (2) Characterization of the wastes remaining in each surface impoundment;
- (3) A summary of specific plans for closure under Chapter 15 for each surface impoundment; and
- (4) A summary of specific plans, for the ponds remaining in service, for retrofitting or appropriate modification of any surface impoundment needed to meet requirements of Article 7 of Chapter 15.

11. The discharger shall perform the following items related to bringing the portions of the project not previously covered in these provisions into compliance with Chapter 15:

a. May 15, 1992

The discharger shall provide a report that will describe the activities necessary to bring the project into full compliance with Article 7, Chapter 15 and a plant site drainage control plan for a 100 year, 24 hour storm event. Included shall be a time schedule for completion of the items described.

b. May 15, 1992

Submit a written report documenting progress towards compliance with Chapter 15, Title 23, Cal. Code of Regs for Group B mining waste. The report shall include, but is not limited to:

- (1) a description of those items for which compliance has been achieved,
- (2) a description of those items for which compliance has not been achieved,
- (3) a time schedule for additional proposed compliance actions,
- (4) a description of those items for which compliance will not be achieved because compliance is impractical, and
- (5) demonstration(s) that compliance with construction or prescriptive standards for those items in (4) above is impractical.

c. May 15, 1992

Submit a Report of Waste Discharge under Section 13260 of the Cal. Water Code and Section 2590, Chapter 15, Cal. Code of Reg., for the Molycorp Solid Waste Landfill.

d. January 1, 1996

The discharger shall bring the project into full compliance with Discharge Specification I.C.4.

12. The discharger shall perform the following items related to unsaturated zone monitoring:

a. January 1, 1992

submit a report proposing an unsaturated zone monitoring system for each disposal and product storage pond in accordance with Section 2559, Chapter 15, Cal. Code of Regs.

b. June 1, 1992

Provide unsaturated zone monitoring for each product and disposal pond. Prior to installation the Executive Officer shall approve the design and location of the unsaturated zone monitoring system.



13. The discharger shall perform the following items related to ground water monitoring:
  - a. January 1, 1992  
  
submit a report proposing a ground water monitoring program for P-16. A sufficient number of wells to verify background water quality and represent the quality of water passing the "point of compliance" shall be installed in accordance with Section 2555, Chapter 15, Cal. Code of Regs.
  - b. June 1, 1992  
  
Provide ground water monitoring for P-16. Prior to installation the Executive Officer shall approve the design and location of the ground water monitoring system.
  - c. July 1, 1992  
  
Provide to the Executive Officer an as-built design report for both the ground water and the unsaturated zone monitoring system. This report shall include a certification signed by a California registered civil engineer, geologist or engineering geologist regarding the placement, lithology, and construction of the wells.
14. Pursuant to Section 13267 of the Cal. Water Code, the discharger shall notify the Board by telephone within 24 hours whenever an adverse condition occurs as a result of an unauthorized discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills, discharges outside of the authorized disposal sites or discharges in violation of this Order.
15. Any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge shall be reported to this Board at least 120 days in advance of implementation of any such proposal. This includes activities by the discharger necessary to bring the project into compliance with this Order.
16. The California Regional Water Quality Control Board, Lahontan Region, hereby reserves the privilege of changing all or any portion of this Order for cause and upon legal notice and after an opportunity to be heard is given to all concerned parties.
17. A copy of this Order and Monitoring and Reporting Program shall be available at all times at the facility site for immediate reference by all Molycorp, Inc. employees.

18. The following transfer of ownership/operator provisions apply:
- a. The property owner shall be considered to have a continuing responsibility for ensuring compliance with these waste discharge requirements in the operation or use of the property.
  - b. Any change in the ownership and/or operation of property subject to waste discharge requirements shall be reported to this Board.
  - c. Existing waste discharge requirements shall be furnished to any new owner(s) and/or operator(s).
  - d. This Order is transferable only if all requirements for transfer established by the Regional Board are complied with.
19. "Ground waters," as used in this Order, include, but are not limited to all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.
20. "Surface waters," as used in this Order, include, but are not limited to all live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of the waters.
21. "Hazardous Waste," as used in this Order, is defined in Section 2521, Chapter 15.
22. The discharger shall permit the Regional Board staff the following:
- a. to enter upon premises in which an effluent source is located or in which any required records are kept;
  - b. to copy any records required to be kept under terms and conditions of this Order;
  - c. to inspect monitoring equipment or records; and
  - d. to sample any discharge.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on June 13, 1991.



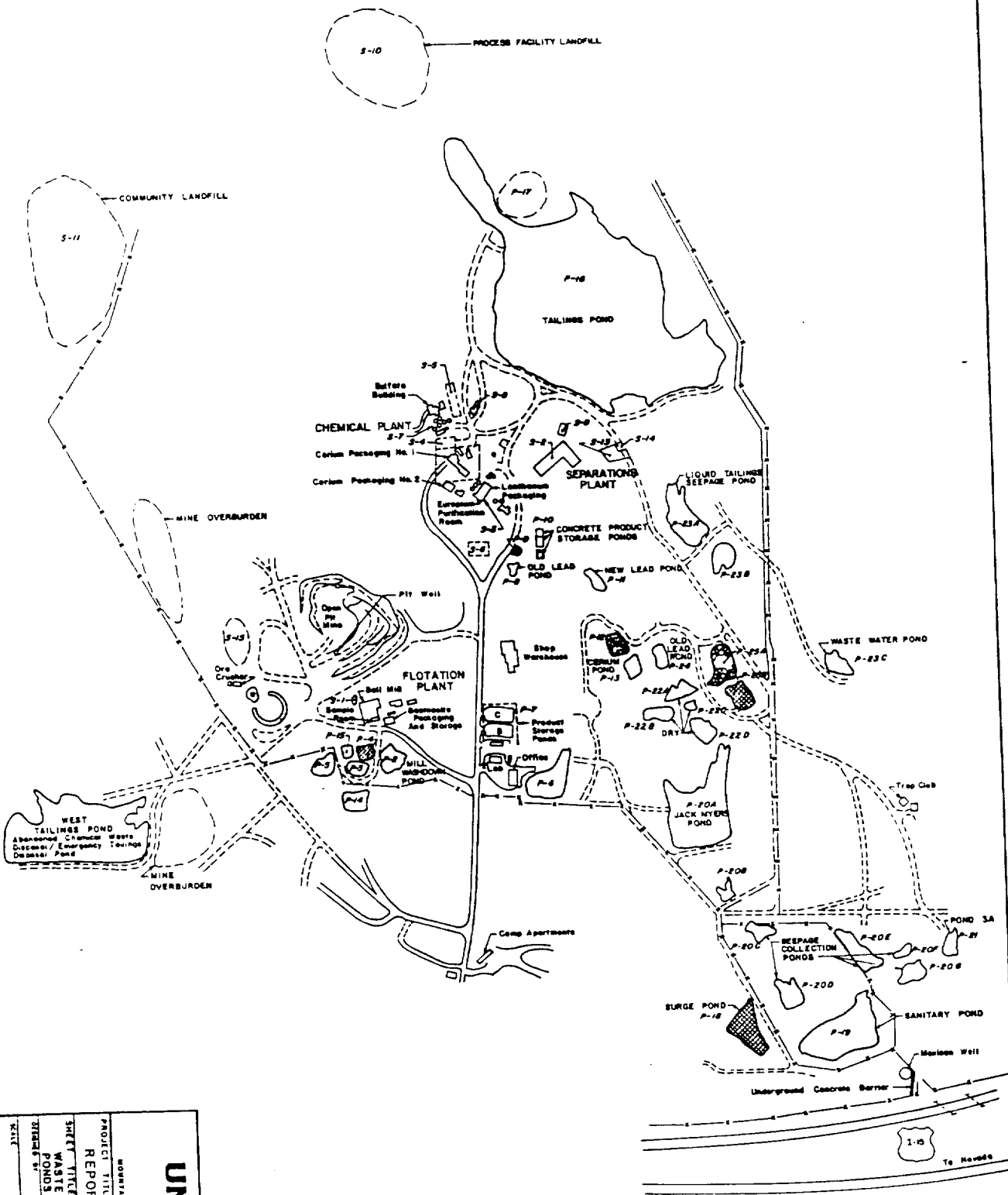
HAROLD J. SINGER  
EXECUTIVE OFFICER



# ATTACHMENT "A"

Molycorp, Inc. Mountain Pass Mine and Mill Operations  
 Sections 11, 12, 13, and 14, T16N, R13E, SBB&M  
 USGS 15 Minute Series, Mescal Range and Ivanpah

# ATTACHMENT "B"



## Molycorp, Inc. Mountain Pass Mine and Mill

### LEGEND

- HTYPALON LINED PONDS
- HDPE LINED PONDS
- ASPHALT LINED PONDS
- FENCE LINE
- DIRT ROADS
- PAVED ROADS
- P-1 POND
- S-1 STORAGE AREA

NOTES: 1. BUILDINGS AND STORAGE AREAS NOT DRAWN TO SCALE.  
2. DASHED BOUNDARIES INDICATE AREAS WHICH ARE NOT MAPPED. LOCATIONS AND EXTENT OF AREAS ARE APPROXIMATE.

UNOCAL <sup>®</sup>	
MOLYCORP	
MOUNTAIN PASS OPERATIONS, MOUNTAIN PASS, CALIFORNIA	
PROJECT TITLE	
REPORT OF WASTE DISCHARGE	
SHEET TITLE	
WASTE/PRODUCT STORAGE AREAS, POND AND LANDFILL	
DATE	4-7-86
BY	WMT
FIGURE	3
0	

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. 91-836  
WDID NO. 6B362098001

FOR

MOLYCORP, INC.  
MOUNTAIN PASS MINE AND MILL

San Bernardino County

---

I. MONITORING

A. Disposal Pond Flow Monitoring (P-16, P-19, P-20A, P-23A and P-23B)

The following shall be recorded in a permanent record:

1. The cumulative total of wastewater flow to each surface impoundment, in million gallons, per month.
2. The average flowrate, in mgd, to each surface impoundment each month.

B. Disposal Pond Monitoring (P-16 and P-19)

1. Weekly, the freeboard measured from the top of the lowest part of the dike to the wastewater surface pond shall be recorded in a permanent record. If the pond is dry, indicate this in the monitoring report.
2. Monthly, the integrity of the dikes and liners shall be checked. Should the inspection indicate any unauthorized discharge has occurred or may occur, the Regional Board shall be notified immediately by telephone followed by confirmation in writing.
3. Quarterly, a grab sample of wastewater in P-16 shall be collected and analyzed to determine the concentration of the following:

<u>Parameter</u>	<u>Units</u>
Total Kjeldahl Nitrogen	mg/l
Total Dissolved Solids	"
Chemical Oxygen Demand	"
Dissolved Oxygen	"
Methyl Blue Active	"
Substances	"
Lignin and Tannin	"
Lead	mg/l
Barium	"
Strontium	"
Electrical Conductivity	umhos/cm
pH	pH units

4. Annually, a composite sample of at least three (3) randomly selected samples of settled solids (sludge) representing deposition during the previous year in P-16 shall be collected and analyzed to determine the concentration of the following constituents:

<u>Parameter</u>	<u>Unit</u>
Arsenic	mg/l
Chromium	"
Copper	"
Lead	"
Selenium	"
Strontium	"
Zinc	"

5. Quarterly, a grab sample of wastewater in P-19 shall be collected and analyzed for the following:

<u>Parameter</u>	<u>Units</u>
Dissolved Oxygen	mg/l
Methylene Blue	"
Active Substances	"
Total Dissolved Solids	"
Biological Oxygen	"
Demand	"
pH	pH units

C. Product Storage Pond Monitoring (P-7A, P-7B, P-10, P-25A, P-25B and P-28)

The following shall be recorded in a permanent record:

1. Monthly, the freeboard measured from the top of the lowest part of the dike to the wastewater surface in each product storage pond shall be recorded. If the pond is dry, indicate this in the monitoring report.
2. Monthly, the integrity of the dikes and liners in each product storage pond shall be checked. Should the inspection indicate any unauthorized discharge has occurred or may occur, the Regional Board shall be notified immediately by telephone followed by confirmation in writing.
3. Monthly, a description of the type of product stored in each pond shall be recorded.

D. Contaminated Ground Water Monitoring

1. Quarterly, the discharger shall submit ground water flow direction and ground water quality monitoring data based on the "Corrective Action Program" that is required to be submitted under Provision 5 of this Order.
2. Annually, by March 30 of each year the discharger shall submit a report with the following information covering the previous calendar year:
  - a. Graphical and tabular data for the monitoring data obtained for the previous year; and
  - b. An assessment made by a California registered civil engineer or engineering geologist as to the effectiveness of the cleanup and recommended actions for the upcoming year.

E. Unsaturated Zone Monitoring

1. Each quarter, the unsaturated zone monitoring system for each pond shall be tested to determine if moisture is present. The results shall be reported each quarter.

F. Ground Water Monitoring

1. Based on the ground water flow direction, the placement and designation of the upgradient and downgradient wells shall be verified annually, as appropriate. Annually, a map showing the wells sampled and ground water elevations shall be submitted.
2. Quarterly, the following measurements shall be taken and recorded:

<u>Parameter</u>	<u>Units</u>
Static Water Level	Feet above mean sea level
Electrical Conductivity	micromhos/cm
pH	pH
Temperature	deg. F or C
Lead	mg/l
Strontium	mg/l
Barium	mg/l
Nitrate as nitrogen	mg/l
Total Dissolved Solids	mg/l
Methylene Blue Active Substances	mg/l
Tannin and Lignin	mg/l

3. Each monitoring well shall be sufficiently purged, in accordance with generally accepted sampling practice, to obtain a "representative" ground water sample.

G. Sampling Methods

1. Ground water and unsaturated zone monitoring shall be conducted using the procedures specified in the report that is required to be submitted by November 15, 1991 (Provision 5.a). An updated monitoring and sampling program shall be submitted whenever changes to the program are implemented.
2. Sampling analyses methods shall be in accordance with the current editions of one of the following documents:
  - a. Test Methods for Evaluating Solid Waste, EPA
  - b. Methods for Chemical Analysis of Water and Wastes, EPA
  - c. Standard Methods for the Examination of Water and Wastewater
  - d. Section 66699 and 66700, Division 4, Title 22, Cal. Code of Regs, for determination of hazardous waste classifications.

Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The method used shall also be reported.

3. The following analytical procedure may be used for the analyses of solid mine waste to determine threat to water quality and may not be used for determining if a waste is hazardous. The appropriate criteria of Title 22, Cal. Code of Regs shall be used for hazardous waste classification.
  - a. The Waste Extraction Test (WET), Section 66700, Title 22, Cal. Code of Regs may be summarized as follows:

Leach Solution: Sodium citrate buffer at pH = 5  
Concentration: 0.2 M  
Ratio: 10:1, solvent to solid  
Time: 48 hours  
Temperature: 20 - 40 C
  - b. By adjusting the solvent to solid ratio, less leaching will occur, however it will still pick up those metals which are in great abundance and could present a problem some years in the future. Refer to A Study of Heavy Metal Leaching of Mine Waste Tailings, Dr. Londa Borer, September 1988, prepared for the Department of Health Services, Alternative Technologies Section. The Modified WET (Londa Borer-Skov) procedures are as follows:



- (1) Perform the WET pH 5, ratio of 16:1, at 35 C. This represents an increase in the ratio from 10:1 to 16:1.
- (2) If the sample fails the WET, perform the acid generating, base neutralization and net potential tests. Refer to the Designated Level Methodology, Dr. Jon Marshack, June 1989, CRWQCB CVR.

This test will be site specific and take into account the type of rock present and the processing used to obtain the ore.

- (3) If the net potential is a positive number, perform the WET at pH = 9.
  - (4) Use a 24 hour leach time instead of 48 hours.
4. The current procedure that Molycorp is using to analyze ground water for lignin sulfonate must be verified for analytical accuracy and quality control and assurance. The ground water sampling plan that is due by January 1, 1992 must include justifications for use of the procedure. If it can be shown that the method for lignin sulfonate analyses is valid to determine concentrations in the ground water then it may be used. Otherwise, the procedure shall be replaced with the Standard Method procedure for lignins and tannins.

#### H. Operation & Maintenance

A brief summary of any operational problems and maintenance activities shall be submitted to the Regional Board with each monitoring report for Mountain Pass Operations. This summary shall discuss:

1. Any modifications, additions, or major maintenance to the wastewater conveyance system, treatment facilities, or disposal facilities.
2. Any major problems occurring in the wastewater conveyance system, treatment facilities, or disposal facilities.
3. The calibration of any wastewater flow measuring devices.

## II. REPORTING

### A. Submittal Periods

Beginning on October 15, 1991, quarterly monitoring reports including the preceding information shall be submitted to the Board by the 15th day of each month following each quarterly sampling.

### B. Authorization

Monitoring reports shall be signed by either a principal executive officer, ranking elected official, or other duly authorized employee.

### C. Information

Monitoring reports are to include the following:

1. Name and telephone number of an individual who can answer questions about the report.
2. Monitoring and Reporting Program No. 91-(PROPOSED)
3. WDID No. 6B362098001

### D. Annual Report

By March 30 of each year, the discharger shall submit an annual report to the Regional Board with the following information:

1. The compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the discharge requirements.
2. Evidence that adequate financial assurance for closure is still in effect. Evidence may include a copy of the renewed financial instrument or a copy of the receipt for payment of the financial instrument.
3. Evidence that the amount is still adequate or increase the amount of financial assurance by the appropriate amount if necessary, due to inflation, a change in the approved closure plan, or other unforeseen events.
4. Graphical and tabular data for the monitoring data obtained for the previous year.
5. A description documenting progress in attaining full compliance with Chapter 15 regulations. The report shall include a description of all actions accomplished and a time schedule for additional proposed compliance actions.

6. A description of those items taken during the previous year to satisfy the requirements of the Surface Mining and Reclamation Act and your approved mine reclamation plan.
7. A review of the closure plan and certification that it is still adequate.

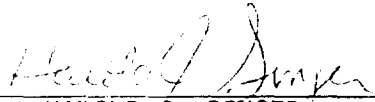
E. Failure to Furnish Reports

Any person failing or refusing to furnish technical or monitoring reports or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars (\$1,000) for each day of violation under Section 13268 of the Water Code.

F. Violations

If monitoring data indicate violation of waste discharge requirements, the discharger shall provide information indicating the cause of violation(s) and action taken or planned to bring the discharge into compliance.

Ordered by: \_\_\_\_\_

  
HAROLD J. SINGER  
EXECUTIVE OFFICER

Dated: June 13, 1991

CL

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

FACT SHEET

ITEM: 5 BOARD ORDER NO. 6-90-56  
WDID NO. 6B369006001

DISCHARGER NAME: Molycorp, Inc.

PROJECT NAME: Old Ivanpah Dry Lake Evaporation Ponds

PROJECT TYPE: Closure in place of mine waste surface impoundments

LOCATION: Mountain Pass, Ivanpah Dry Lake, about eight miles west of Nipton, San Bernardino County  
T16N, R15E, Section 33, SBB&M

TYPES OF WASTE: Residual Solids and Sludges classified as Group B mining wastes

WASTE MANAGEMENT UNIT CLASSIFICATION: Surface Impoundment with Group B mining wastes

TREATMENT FACILITIES: None

DISPOSAL FACILITIES: Evaporation ponds

THREAT/COMPLEXITY: 2/C

PRESENT FLOW: 0.0 mgd

PROPOSED FLOW: 0.0 mgd

DESIGN FLOW: 0.0 mgd

CEQA COMPLIANCE: Categorical Exemption, Class 1, Existing Facility

LANDOWNER: Molycorp Inc., patented public land from the U.S. Dept. of the Interior, Bureau of Land Management

LAND CONTROLLED BY: Molycorp, Inc.

NEARBY DEVELOPMENT: None

NATURE OF AREA: High Desert, closed basin, edge of dry lake playa

Ref. # 15

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

BOARD ORDER NO. 6-90-56  
WDID NO. 6B369006001

CLOSURE WASTE DISCHARGE REQUIREMENTS

FOR

MOLYCORP, INC.  
OLD IVANPAH DRY LAKE WASTEWATER EVAPORATION PONDS

San Bernardino County

---

The California Regional Water Quality Control Board, Lahontan Region, finds:

1. Discharger

Molycorp, Inc. submitted a complete closure plan for the old wastewater evaporation ponds located on Ivanpah dry lake on August 10, 1990. The U.S. Department of the Interior, Bureau of Land Management (previous landowner) patented the land (Patent No. 04-89-0002) to Molycorp on October 12, 1988. Molycorp, Inc. (operator) is hereinafter referred to as the "discharger."

2. Project location

The project is located about eight miles east of Mountain Pass in the Ivanpah Hydrologic Unit within Section 33, T16N, R15E, SBB&M as shown on Attachments "A," and "B." Which are made a part of this order. The new Ivanpah Dry Lake wastewater evaporation pond is located about three miles to the north. The Molycorp Inc. Mountain Pass Mine Operation is located about eight miles to the west in the Clark mountains and was the source of wastewater discharge.

3. Reason for Action

The Board is adopting closure waste discharge requirements to ensure the old evaporation ponds are closed according to regulations contained in Subchapter 15, Title 23, Cal. Code of Regs. (hereinafter Subchapter 15) and that post-closure maintenance will be performed to ensure the protection of water quality. This Order may be rescinded when the Board determines that the waste no longer poses a threat to water quality.

4. Project History

The Molycorp operations began in 1950 in the Mountain Pass area. Mine wastewater was disposed to percolation ponds onsite until 1980. Two rectangular 38-acre evaporation ponds were constructed on Ivanpah Dry Lake and waste water was delivered by pipeline from the mill down the Wheaton Wash. The south surface impoundment was completed in October 1980. The north surface impoundment was completed in December 1981. In 1985, ground water monitoring wells were installed and sample results indicated increasing total dissolved solids (TDS) levels and the ponds were determined to be leaking. In 1988, the new Ivanpah evaporation pond was constructed three miles north of the old ponds to receive the wastewater.

5. Permit History

The following Regional Board actions have been taken regarding the project:

- a. On September 19, 1981 waste discharge requirements for the Mountain Pass Operation were adopted under Board Order No. 6-81-73.
- b. On October 3, 1985 Time Schedule Order (TSO) No. 6-85-116 was issued requiring an investigation of the effects of leakage from the old evaporation ponds.
- c. On August 14, 1986 Cease and Desist Order (CDO) No. 6-86-101 was issued requiring Molycorp to stop discharging waste in violation of Board Order No. 6-81-73. A time schedule required replacement of the existing ponds by September 1, 1987.

6. Other Waste Discharge Requirements

- a. Portions of Board Order No. 6-81-73 will continue in effect to allow Molycorp to discharge tailings at the mill facility until it is revised or updated.
- b. Board Order No. 6-90-41 regulates discharge of wastewater to the new Ivanpah evaporation pond.

7. Toxic Pits Cleanup Act (TPCA)

- a. On November 4, 1985, the Regional Board notified Molycorp that the old evaporation ponds contained hazardous constituents (lead) and a Hydrogeological Assessment Report (HAR) was required by January 1, 1986.
- b. On December 30, 1985, Molycorp submitted a HAR for the old Ivanpah evaporation ponds.
- c. On November 13, 1987, the Regional Board issued Resolution No. 6-87-151 approving a closure exemption for all Molycorp ponds. No retrofit exemption was granted for the old evaporation ponds because they were being closed (April 29, 1988 letter).
- d. The Regional Board has reviewed the HAR and determined it to be adequate. Molycorp will provide one year of monitoring before the ponds may be taken out of the TPCA program.

8. Site Geology

The Ivanpah Dry Lake is a nearly level, generally dry bottom of a former lake in the lowest part of a closed desert basin. The smooth surface is composed of fine grained sediments and is frequently inundated after rainy periods. The old evaporation ponds are located on the south edge

of the playa. The subsoils beneath the ponds are comprised of playa deposits that include fine grained silts and clays. Some lenses of coarser material may be expected at the playa interface.

9. Site Hydrology

The upper 90 feet of playa deposits are unsaturated and contain water at TDS levels of 3,000 to 20,000 mg/l. Ground water beneath the old evaporation ponds is of fair quality with TDS values from 200 to 600 mg/l except for the contamination noted in this Order. Monitoring well D-1 has TDS values of up to 13,000 mg/l. Ground water moves into the basin as infiltration from precipitation and recharge from alluvial fans and is of good quality with TDS values of about 300 mg/l. As ground water encounters playa sediments it rises and discharges along the margins of the playa and dissolves native salts as it sinks into the playa sediments. Water for the MolyCorp operations is supplied from company wells located less than one mile southwest of the old evaporation ponds on the Wheaton Wash alluvial fans and is of fair quality with TDS values of about 650 mg/l. The well field has influenced the ground water flow under the ponds by changing the gradient from generally north, to west southwest.

10. Waste Stream Identification

- a. All remaining liquids have been evaporated from the evaporation ponds.
- b. About 1000 cubic yards of settled solids and sludges remain spread less than one (1") inch deep over the ponds.
- c. Surface samples from the pond bottoms have been collected. Constituents of concern are leachable TDS (up to 75,000 mg/kg), SR (up to 13,000 mg/kg) and Lead. Extractable Lead concentrations range from less than 0.5 mg/l to 13 mg/l in the top 18" of the pond bottoms using the California Assessment Manual Wet test of Title 22, Cal. Code of Regs. The Lead has been shown to be attenuated within the top 6" of material.

11. Waste Classification

- a. On July 21, 1989, the Department of Health Services notified MolyCorp that the solids remaining in the ponds have mitigating chemical characteristics which render them insignificant as hazards to human health and safety, livestock, and wildlife are therefore classified as nonhazardous.
- b. The remaining solids are classified as solid Group B mining wastes under Section 2571(b)(2)(B), Subchapter 15.

12. Authorized Disposal Sites

The closed surface impoundments are the only authorized disposal site and no current or future discharges are allowed. The authorized disposal site is on patented mining claims owned by MolyCorp. The public land was previously administered by the U.S. Department of the Interior, Bureau of Land Management.

13. Waste Management Unit Classification

The old Ivanpah evaporation ponds are classified as closed surface impoundments which received mining wastes and/or wastewaters that are classified as Group B wastes under Article 7 of Subchapter 15, Section 2571.

14. Water Quality Protection Standards

Section 2552 of Subchapter 15 requires that water quality protection standards be established for ground water underlying disposal sites regulated by Subchapter 15. This Order requires that water quality protection standards (background levels) be established for lead (Pb), total dissolved solids (TDS), and Strontium (SR) when sufficient ground water data has been collected as specified in Section 2595(g)(6) and (7) of Subchapter 15.

15. Closure Plan

The discharger has submitted a closure and post-closure maintenance plan in conformance with Subchapter 15, dated June 4, 1990. Section 2574(k), Subchapter 15, allows in-place closure of a mining waste management unit if a lower clay liner is provided and the requirements of Section 2581(a) are complied with. Following is a comparison of the prescriptive standard and the proposed closure plan.

- a. 2581(a)(1) - a two foot foundation layer over the closed unit unless little differential settlement is expected.

Closure Plan - no foundation layer will be provided because no differential settlement is expected.

- b. 2581(a)(2) - a minimum of one foot compacted clay to a permeability of less than  $1 \times 10^{-6}$  cm/sec.

Closure Plan - Six inches of compacted clay to a permeability of less than  $1 \times 10^{-6}$  cm/sec.

- c. 2581(a)(3) - a minimum of one foot of cover material or the depth of the root zone of expected plants.

Closure Plan - One foot of soil cover will be provided. The plant root zone is not expected to exceed one foot.



- d. 2581(a)(4) - a cover that is designed and constructed to function with the minimum maintenance possible.

Closure Plan - meets prescriptive standard. Also, this Order incorporates quarterly inspections of the cover.

- e. Existing Lower Liner - The existing lower clay liner consists of native clay, one foot thick, compacted to 95% of maximum dry density with an expected permeability of  $1 \times 10^{-8}$  cm/sec, as measured in the laboratory.

16. Engineered Alternatives

Section 2510 (b), Subchapter 15 provides that engineered alternatives to the liner requirements may be considered where the discharger demonstrates that:

- "1. The construction or prescriptive standard is not feasible as provided in Subsection (c) of this section, and
- "2. There is a specific engineered alternative that (A) is consistent with the performance goal addressed by the particular construction or prescriptive standard, and (B) provides equivalent protection against water quality impairment."

17. Feasibility of Construction or Prescriptive Standard, 2510(b)(1)

In conformance with Section 2510(b)(1), Subchapter 15, and as described in Section 2510(c)(1) and (2), Subchapter 15, the discharger has demonstrated that the prescriptive standard is unreasonably and unnecessarily burdensome and will cost substantially more than alternatives or is impractical and will not promote attainment of performance standards in that:

- a. The discharger has provided information to show that the lead is confined to the upper six inches of the pond bottoms and is fairly immobile.
- b. The discharger has shown that in a dry climate environment the waste is relatively immobile and is not expected to leach to ground water.
- c. The discharger has shown that the cost of compliance with the prescriptive standard to be about two and one-half (2.5) times more than the proposed closure plan implementation costs.

18. Specific Engineered Alternative, Section 2510(b)(2)

In conformance with Section 2510(b)(2), Subchapter 15, the discharger has demonstrated that the reduced clay upper liner is consistent with the performance goal addressed by the prescriptive standard and provides equivalent protection against water quality impairment in that:

- a. A quality assurance/quality control plan will ensure uniform liner thickness and permeability.
- b. A one and one-half foot of cover material will be provided to protect the upper clay liner from plant root intrusion and rodent burrowing.
- c. A series of gypsum blocks will be provided to monitor moisture at the clay liner. This will detect if sufficient moisture is available to permit leaching of waste and warrant a closer examination of the clay liner.
- d. No differential settlement is expected and thus no foundation material will be needed.

19. Ground Water Contamination

The discharger submitted a report in January 1986 that indicated contamination of the ground water has occurred. Likely causes were (a) the pond liners allowed leakage at a faster rate than expected and (b) an unlined construction water pond allowed waste water to percolate down. In 1985, Well D-1 was extracting 25 gal/min of contaminated ground water. This Order requires the discharger to continue a corrective action program as required in Section 2558, Subchapter 15.

20. Financial Assurance

The closure plan indicates that after closure, about \$20,000 to \$40,000 per year will be needed for sampling and post-closure maintenance. The discharger will include this amount in their yearly operational budget. No additional financial assurance is needed.

21. SMARA

The closure plan is in conformance with the Surface Mining and Reclamation Act of 1975 (SMARA) and has been approved by the County of San Bernardino on July 20, 1990.

22. Basin Plan

The Board adopted a Water Quality Control Plan (Basin Plan) for the South Lahontan Basin on May 8, 1975. This Order implements the Plan.

23. Beneficial Uses

The present and potential beneficial uses of the ground waters of the Ivanpah Hydrologic Unit as set forth and defined in the Basin Plan are:

- a. municipal and domestic supply
- b. agricultural supply
- c. industrial service supply
- d. freshwater replenishment

24. CEQA Compliance

These closure waste discharge requirements govern existing facilities which the discharger currently operates. The project consists only of closure and post-closure maintenance in accordance with an approved closure plan and is therefore exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Section 15301 (Categorical Exemption Class 1), Chapter 3, Title 14, Cal. Code of Regs.

25. CEQA Water Quality Effect

Closure of the project will not have a significant effect on water quality.

26. Mining Waste Management Strategy

Section 13263.1 of the Water Code requires the Regional Board to determine that the mining waste discharge is consistent with a waste management strategy that prevents pollution or contamination of waters of the state, particularly after closure of the mining waste management unit. Principle elements of this plan include:

- a. regulation of the project by closure waste discharge requirements;
- b. closure of the old evaporation ponds is in accordance with an approved closure plan meeting Subchapter 15 criteria;
- c. a detection monitoring plan to verify compliance; and
- d. a post-closure maintenance plan to insure the closed management unit will not contaminate waters of the state.

27. The project as approved by the Regional Board is consistent with a mining waste strategy that prevents the pollution or contamination of the waters of the state.

28. Notification of Interested Parties

The Board has notified the discharger and all known interested agencies and persons of its intent to issue revised waste discharge requirements.

29. Consideration of Comments

The Board has, in a public meeting, heard and considered all comments pertaining to the discharges.

IT IS HEREBY ORDERED that the discharger shall comply with the following:

I. DISCHARGE SPECIFICATIONS

A. Receiving Water Limitations

1. The past discharge of wastes shall not cause the presence of the following substances or conditions in the surface or ground waters of the Ivanpah Hydrologic Unit:
  - a. any perceptible color, odor, taste or foaming;
  - b. any presence of toxic substances in concentrations that individually, collectively, or cumulatively cause detrimental physiological responses in humans, plants, animals, or aquatic life.
  - c. any presence of the following indicator parameters in concentrations that exceed water quality protection standards (background levels):
    - i. lead
    - ii. strontium
    - iii. total dissolved solids

B. General Requirements and Prohibitions

1. The closed surface impoundment shall be effectively sealed to prevent the infiltration and exfiltration of any liquids.
2. If the presence of liquid is detected in the pond moisture detection system, the integrity of the closed surface impoundment shall be investigated as soon as feasible.
3. The closed surface impoundment shall not cause a nuisance, pollution, or threatened pollution as defined in Section 13050 of the Water Code.
4. The closed surface impoundment shall be in compliance with the requirements of Section 2574 (Closure and Post-Closure Maintenance), Subchapter 15, for Group B mining wastes, except for those engineered alternatives granted by this Order.
5. Ground water and unsaturated zone monitoring must be provided in compliance with Sections 2553 (Points of Compliance), 2554 (Compliance Period), 2555 (General Ground Water Monitoring Requirements), 2556 (Detection Monitoring Program), and 2559 (Unsaturated Zone Monitoring), Subchapter 15.
6. Ground water monitoring wells must be properly constructed, developed and abandoned as defined in Department of Water Resources Bulletin 74-081, "Water Well Standards: State of California."

7. The closed surface impoundments shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of 100 years.
8. No post-closure uses of the land shall be permitted that might impair the integrity of the containment structures.
9. The discharger shall remove and relocate to an authorized disposal site any wastes which are discharged at the disposal site in violation of this Order.
10. The discharge of waste to the surface impoundments is prohibited.
11. The closed surface impoundment shall be closed in accordance with the approved Closure Plan.

## II. PROVISIONS

1. The discharger shall comply with Monitoring and Reporting Program No. 90-(PROPOSED) as specified by the Executive Officer.
2. The discharger shall implement a "Corrective Action Program," as specified in Section 2558, Subchapter 15.
3. The discharger shall submit the following information as specified:

a. December 13, 1990

The discharger shall submit a report that proposes background levels to determine water quality protection standards for lead, total dissolved solids, and strontium in accordance with Section 2552, Subchapter 15. After review and acceptance by the Executive Officer, the numerical values shall be considered as background levels of the above indicator parameters. Report them as required in the attached Monitoring and Reporting Program.

b. December 13, 1990

The discharger shall provide a report that:

- (1) assesses the corrective actions that have been taken to clean up contaminated ground water;
- (2) propose a corrective action strategy for final remediation; and

- (3) After acceptance by the Executive Officer initiate the corrective action.


c. March 13, 1991

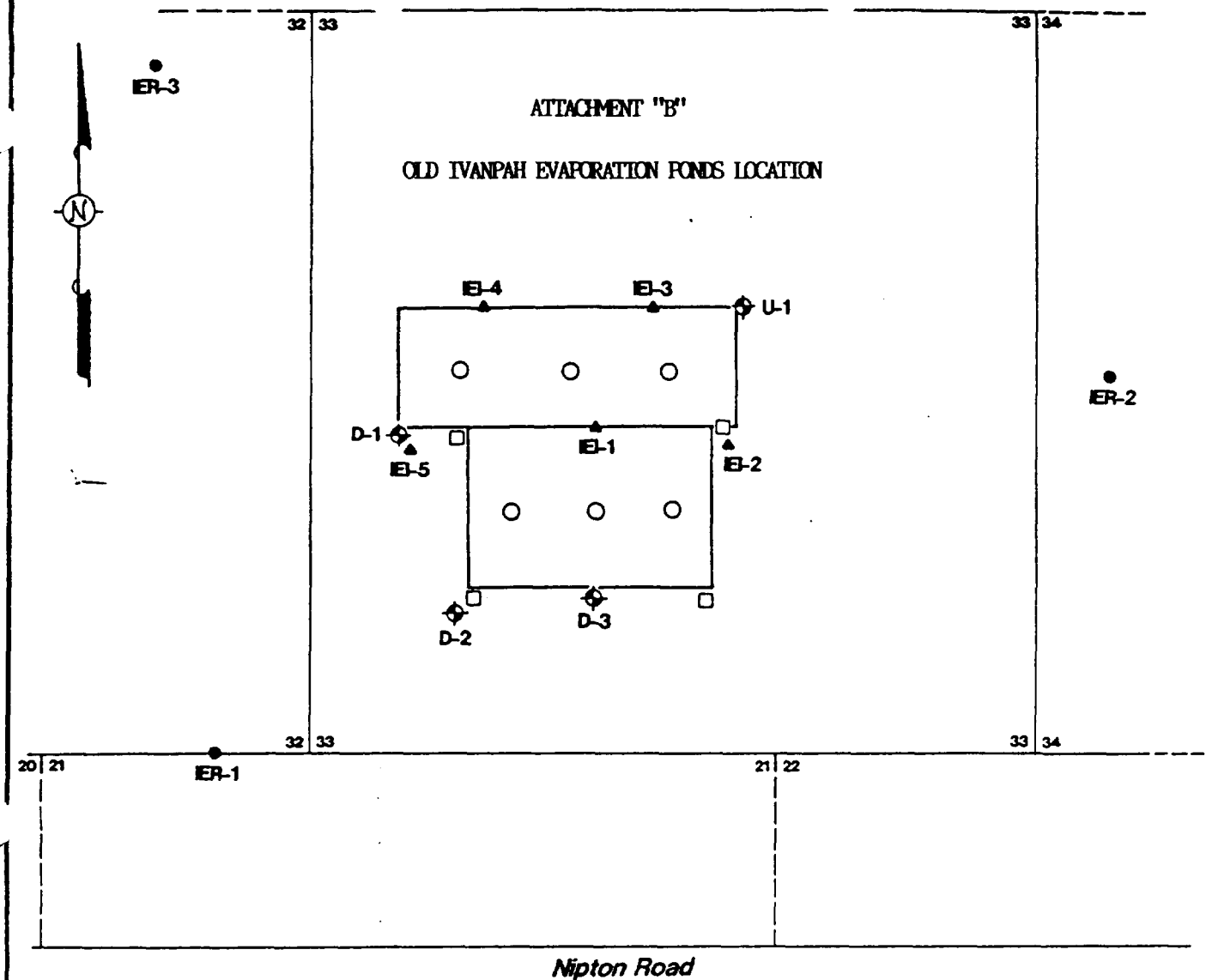
The discharger shall provide certification of completion signed by a California registered civil engineer or engineering geologist that the closure activities have been completed in accordance with the approved closure plan and this Order.

4. The post-closure maintenance plan shall be updated if there is a substantial change in operations. The updating of the plan may be prepared by or under the supervision of the owner or operator of the waste disposal site.
5. The discharger shall notify the Board by telephone within 24 hours whenever an adverse condition occurs as a result of an unauthorized discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, an statistically significant increase in any indicator parameter or damage to storm water runoff control facilities.
6. Any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge shall be reported to this Board at least 120 days in advance of implementation of any such proposal.
7. The California Regional Water Quality Control Board, Lahontan Region, hereby reserves the privilege of changing all or any portion of this Order for cause and upon legal notice and after an opportunity to be heard is given to all concerned parties.
8. A copy of this Order and Monitoring and Reporting Program shall be available at all times at the facility site for immediate reference by all Molycorp, Inc. employees.
9. The property owner shall be considered to have a continuing responsibility for ensuring compliance with these waste discharge requirements in the operation or use of the property. Any change in the ownership and/or operation of property subject to waste discharge requirements shall be reported to this Board. Existing waste discharge requirements shall be furnished to any new owner(s) and/or operator(s).
10. This Order is issued to the discharger listed in Finding No. 1 and is not transferrable to any person or entity.
11. "Ground waters," as used in this Order, include, but are not limited to all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

12. "Surface waters," as used in this Order, include, but are not limited to all live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of the waters.
13. "Hazardous Waste," as used in this Order, is defined in Section 2521, Subchapter 15.
14. The discharger shall permit the Regional Board staff the following under the accompaniment of discharger personnel:
  - a. to enter upon premises in which an effluent source is located or in which any required records are kept;
  - b. to copy any records required to be kept under terms and conditions of this Order;
  - c. to inspect monitoring equipment or records; and
  - d. to sample any discharge.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on September 13, 1990.

  
\_\_\_\_\_  
HAROLD J. SINGER  
EXECUTIVE OFFICER



#### Legend:

- Monitoring well proposed for post closure monitoring
- Proposed background monitoring well
- Proposed vadose monitoring well
- ▲ Steffen Robertson & Kirsten nested monitoring well
- Proposed moisture detection devices

21|22 Section numbers

Scale: 1" = 1250' (approx.)

**KH** KLEINFELDER

**MONITORING NETWORK**

PLATE

6.11

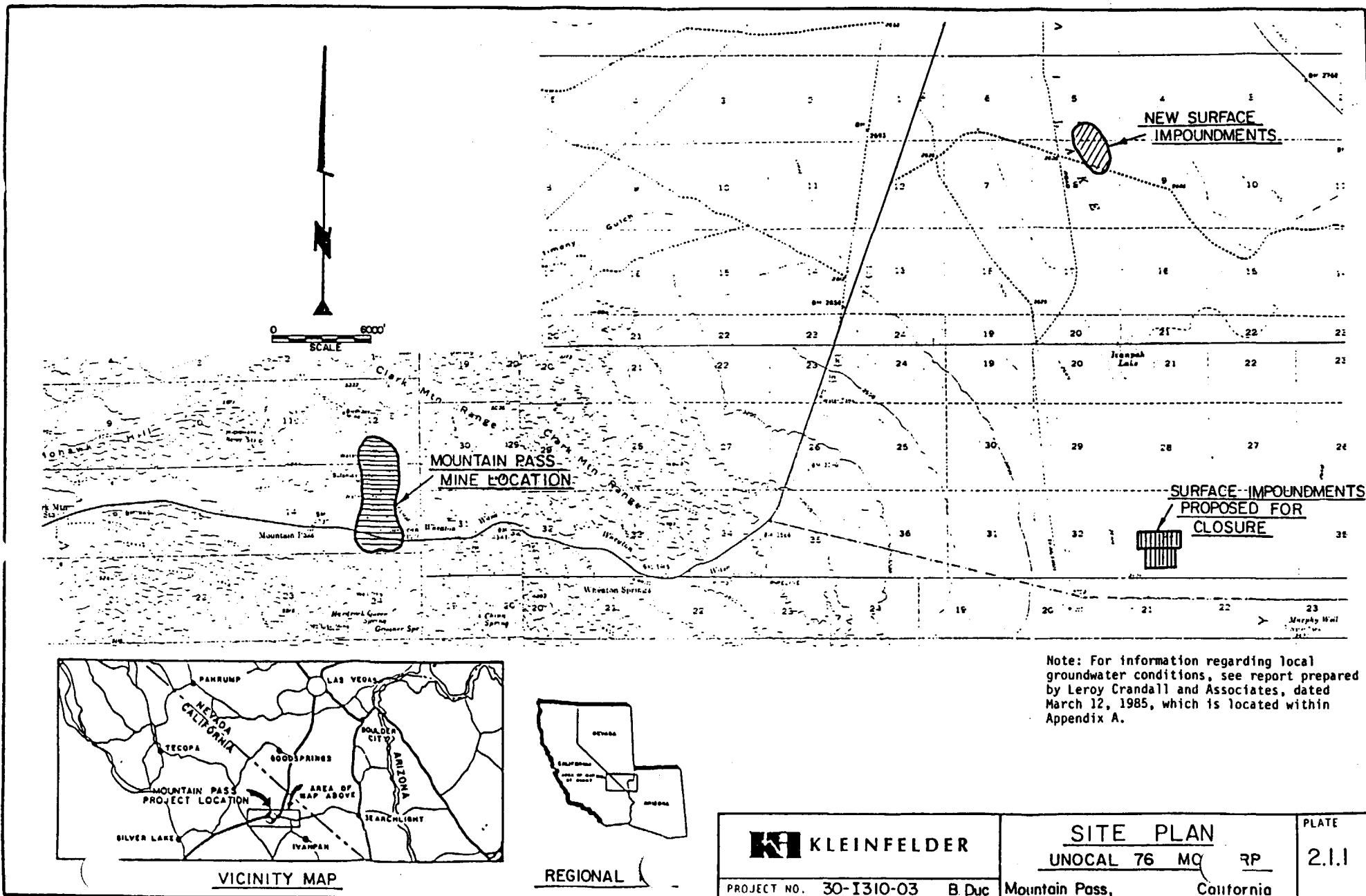
PROJECT NO. 138012



# ATTACHMENT "A"

Molycorp Inc., closed old Ivanpah Evaporation Ponds

USGS 15 minute quad Ivanpah Section 33, RISE, T16N, SB B&M



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. 90-56  
WDID NO. 6B369006001

FOR

MOLYCORP, INC.  
OLD IVANPAH DRY LAKE WASTEWATER EVAPORATION POND  
San Bernardino County

---

I. MONITORING

A. Operation & Maintenance

A brief summary of any operational problems and maintenance activities shall be submitted to the Regional Board with each monitoring report for the old Ivanpah Dry Lake Evaporation Ponds. This summary shall discuss:

1. Evidence of desiccation to the clay liner.
2. Evidence of wind or water erosion to the cover material.
3. Evidence that plants or animals have penetrated the clay liner.
4. Problems with drainage diversion structures.

B. Unsaturated Zone Monitoring

1. Monthly, the six moisture devices or gypsum blocks (three in each closed pond) shall all be tested to determine if moisture is present. The results shall be reported each quarter.
2. If an indication of elevated moisture is occurring then weekly samples shall be taken.

C. Background Water Monitoring

1. Monitoring wells IER-1, IER-2, and IER-3 will be monitored for background water quality outside of the influence of the surface impoundments.
2. Data from these wells will be used to establish the background water quality for water quality objectives as required by the Closure Requirements.

D. Ground Water Monitoring

1. Quarterly, monitoring wells D-1, D-2, D-3 and U-1 shall be sampled and analyzed to determine the concentration of the following:

<u>Parameter</u>	<u>Units</u>
Nitrate as nitrogen	mg/l
Total dissolved solids	"
Chloride	"
Sulfate	"
Calcium	"
Sodium	"
Magnesium	"
Lead	ug/l
Strontium	"
Electrical Conductivity	umhos/cm
pH	pH units
Temperature	Deg. F or C

2. Each time a well is sampled, the direction and velocity of ground water flow under each surface impoundment shall be calculated.
3. The static water level in feet above mean sea level shall be recorded.
4. Based on the ground water flow direction, the placement and designation of the upgradient and downgradient wells shall be verified.
5. Each monitoring well shall be sufficiently purged, in accordance with generally accepted sampling practice, to obtain a "representative" ground water sample.

E. Contaminated Water Cleanup

1. Quarterly, a summary of contaminated ground water cleanup activities shall be reported. Included shall be:
  - a. Volumes of water removed
  - b. Treatment or disposal used
  - c. Location of disposal or reuse.
  - d. Maintenance problems to the extraction wells.
2. Annually, an assessment shall be made by a California registered engineer or certified engineering geologist as to the continued effectiveness of the cleanup and recommended actions for the coming year.

F. Sampling Methods

1. Ground water and unsaturated zone monitoring shall be conducted using the procedures specified in the closure

report submitted on June 4, 1990. An updated monitoring and sampling program shall be submitted whenever changes to the program are implemented.

2. Sampling analyses methods shall be in accordance with the current editions of one of the following documents:

- a. Test Methods for Evaluating Solid Waste, EPA
- b. Methods for Chemical Analysis of Water and Wastes, EPA
- c. Standard Methods for the Examination of Water and Wastewater
- d. Section 66699 and 66700, Division 4, Title 33, Cal. Code of Regs, for determination of hazardous waste classifications.

Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The method used shall also be reported.

G. Statistical Analysis

After water quality protection standards based on background water quality or soil pore liquid quality have been established by the statistical procedures specified in Section 2555(h), Subchapter 15, shall be used to determine if water quality protection standards have been exceeded by a statistically significant amount. Results shall be reported with the monitoring data.

II. REPORTING

A. Submittal Periods

Beginning on January 15, 1991, quarterly monitoring reports including the preceding information shall be submitted to the Board by the 15th day of each month following each quarterly sampling.

B. Authorization

Monitoring reports shall be signed by either a principal executive officer, ranking elected official, or other duly authorized employee.

C. Information

Monitoring reports are to include the following:

1. Name and telephone number of an individual who can answer questions about the report.
2. Monitoring and Reporting Program No. 90-56
3. WDID No. 6B369006001

D. Annual Report

By January 30 of each year, the discharger shall submit an annual report to the Regional Board with the following information:

1. The compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the discharge requirements.
2. Graphical and tabular data for the monitoring data obtained for the previous year.

E. Failure to Furnish Reports

Any person failing or refusing to furnish technical or monitoring reports or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars (\$1,000) for each day of violation under Section 13268 of the Water Code.

Ordered by:

  
HAROLD J. SINGER  
EXECUTIVE OFFICER

Dated: September 13, 1990

## REGIONAL WATER QUALITY CONTROL BOARD

## INTERNAL MEMO

TO: Harold S. Singer  
Executive Officer

FROM: Dave Himebaugh  
WRC Engineer

DATE: September 6, 1990

SIGNATURE: *John W. Cass* for D.H.

SUBJECT: FUTURE REGULATION OF THE MOLYCORP MOUNTAIN PASS MINING OPERATION

This memo is intended to specify the general goals and specific actions needed to be taken at the Molycorp Mountain Pass mine and mill site.

The general goals that both Molycorp and the Regional Board staff have been working toward are as follows:

1. Eliminate the sources of contamination which continue to impact the ground water flow system at the mine and mill facility. This includes:
  - a. Controlling seepage from the main tailings impoundment (p-16),
  - b. Insuring that ground water does not flow through the main tailings impoundment (P16),
  - c. Removing sludge and properly closing unused surface impoundments.
2. Intercept and reuse or dispose of contaminated ground water to prevent spread of contamination to down gradient water supplies. This includes:
  - a. Intercepting seepage from the main tailings impoundment,
  - b. Continue intercepting contaminated ground water at Mexican Wells,
  - c. Provide interception of contaminated groundwater below Mexican Wells at Farmers Wash,
  - d. Provide interception of contaminated ground water flowing westward towards Shadow Valley.
3. Eventually improve the quality of the ground water at the mine and mill sites to a point where it can be used to offset the current use of good quality fresh water and eliminate the need to dispose the contaminated ground water to the new Ivanpah ponds for evaporation.
4. Close in place the old tailings pond (P-1) which has been the disposal site for sludges and other materials from the other miscellaneous ponds which are undergoing closure.

Harold S. Singer  
September 6, 1990

-2-

Molycorp Mountain Pass

The following are the main points of interest concerning the future regulation of the Molycorp Mountain Pass operations:

1. Surge pond (P-18) HAR. As of this writing, P-18 has been clean closed and it is proposed that ground water monitoring be conducted at the site. This monitoring will consist of one monitoring well placed immediately downgradient of the P-18 location (see Mountain Pass HAR letter). If this is done and the results are negative, the HAR report for the Mountain Pass operations will be approved and the entire Molycorp operations will be deleted from the TPCA program. If Molycorp does not conduct ground water monitoring at P-18, then approval of the Mountain Pass HAR may be tied to the Molycorp successfully stopping the seepage of tailings water from the main tailings pond (P-16).
2. P-16 liner evaluation. Molycorp has been testing the feasibility of a low permeability tailings pond liner composed of fine tailings sediments. Molycorp refers to this process as "dry stacking". An area on the east side of P-16 has been closed off for dry stacking testing. If this liner system does not work, Molycorp is faced with using some other type of liner, probably synthetic, removing the tailings from P-16, or somehow stopping the seepage of high TDS tailings water from the pond. My understanding is that verbal agreements between Regional Board and Molycorp staff have produced an unofficial deadline of January 12, 1995 for demonstration of full containment of materials in the main tailings pond. Further details from these agreements are contained in Bob Perdue's tentative WDRs which he wrote for December 1989. These WDRs were tabled and have yet to be adopted.
3. Reduction of tailings water volume to P-16. One of the obvious ways to reduce tailings water seepage from P-16 is to reduce the amount of water in the tailings being pumped to the pond. If the fine sediment liner deposition is not successful, Molycorp may need to explore this option.
4. Evaluation of ground water infiltration through and possible diversion around P-16. One of the possible causes of P-16 tailings water seepage is that upgradient ground water may be high enough to flow through the tailings; thereby leaching and providing hydraulic drive for the leaking of high TDS tailings water. Therefore, determination of ground water levels on the upgradient side of P-16 is of considerable interest. If these levels are found to be high enough to be migrating directly through the tailings or contribute to P-16 leakage, then the

feasibility of upgradient ground water extraction and diversion around P-16 should be examined.

5. Evaluation of P-16 tailings water seepage. Because the effectiveness of intercepting contaminated ground water at Wheaton Wash is questioned, it may prove more effective to intercept ground water immediately downgradient of P-16 with extraction wells. From this point, the water could be gravity fed to the milling plant for reuse.
6. Effectiveness of Mexican well ground water interception. The HAR for the Mountain Pass operations indicates a large subsurface canyon type drainage. This feature is defined by the upper bedrock contact between Interstate 15 and monitoring well SRK-13. This depression trends east-west with the bottom dipping to the west. It is now filled with surface deposits. The bottom of the canyon feature has a lower elevation than the adjacent bedrock/alluvial contact in Wheaton Wash. Therefore, there is concern that the ground water within the surface materials filling the canyon are contaminated with high TDS waters which will not drain or spill over into Wheaton Wash for eventual interception by the Mexican well ground water cutoff. If this is the case, the effectiveness of intercepting contaminated water at Wheaton Wash is very poor because substantial amounts of contaminated ground water remain and possibly diffuse down this canyon structure. Assessment of this problem may prove difficult as the ground water in the canyon structure has some contamination which may or may not be attributed to ground water flows prior to the interception of waters in the mining pit. In any case, two ground water extraction wells have been placed down gradient of the old west tailings pond, P-1, and should do an adequate job of containing high TDS waters from either P-1, P-16 or the canyon feature.
7. Reuse of Mexican well groundwater. The ground water pumped from the Mexican well interceptor trench is currently being routed to the new Ivanpah ponds. Because the waters at the Ivanpah ponds either evaporate or recharge low quality ground waters, this is seen to be a poor use of waters which could be pumped back to the plant for reuse as process water. High quality drinking water is presently being used for the processing plant. If Mexican well water can be substituted for this higher quality water, then degradation of high quality waters can be significantly reduced.
8. Closure plan for the old tailings pond (P-1). P-1 is currently receiving the upper surface material for all the operations ponds which have been "clean closed". P-1 therefore has a significant potential to pollute the adjacent ground waters. Final closure of P-1 should therefore require adequate ground water monitoring to detect any leakage originating specifically from that site. As



Harold S. Singer  
September 6, 1990

-4-

Molycorp Mountain Pass

mentioned above, ground water wells RW-1 and RW-2 are presently extracting high TDS waters which are being piped to the New Ivanpah pond.

9. Closure of remaining operations ponds. Molycorp is presently allocating funds for closure of smaller miscellaneous ponds on a yearly basis. This policy should be maintained until such time as all ponds not in use are closed.
10. Subchapter 15 site regulation. It is anticipated that if Molycorp agrees to do ground water monitoring at P-18, then completion of this monitoring will signal the end of TPCA regulation of the Mountain Pass operations. If and when Molycorp is removed from the TPCA program, Subchapter 15 will then become the program under which the site will receive future regulation.
11. Landfill closures. Two landfills currently exist at the Mountain Pass operations site.
  - a. One is the old municipal landfill which was used for domestic wastes generated by mine employees who lived in an on-site trailer park. This fill is located northwest of the mining pit and should be assessed for leakage under the Calderon (SWAT) legislation. The volume and types of wastes in the fill should be relatively innocuous and therefore may be appropriate for some sort of partial SWAT exemption.
  - b. The second landfill is the mine operations landfill located northwest of P-16 just up the surface drainage. This fill is still active and could possibly contain toxic contaminants. Assessment or regulation of this fill would be under both Calderon and Subchapter 15 legislation. Some ground water assessment of this site may be accomplished by the use of existing monitoring wells. Both landfills are ranked on the SWAT assessment list.
12. SMARA site compliance. Future Waste Discharge Requirements should address the adequacy of site compliance with the Surface Mining and Reclamation Act. Molycorp is apparently in the process of writing a SMARA compliance document for submittal to the county of San Bernardino, the lead agency. It would be prudent to have this document reviewed by Regional Board staff to ensure consistency with our regulatory goals.
13. Site drainage plan. Although the ground water beneath the Mountain Pass facilities is somewhat degraded at this time, a site drainage plan in compliance with Subchapter 15, is needed to prevent not just siltation and excessive storm water runoff, but inundation of ponds and chemical/product storage facilities. Storm events causing the flooding of these facilities could cause considerable ground water contamination problems. Future Waste Discharge Requirements should address the adequacy of site

Harold S. Singer  
September 6, 1990

-5-

Molycorp Mountain Pass

drainage design and the location of hazardous chemical storage in relation to facility drainages.

14. Use of sewage pond effluent. In order to minimize the use of high quality water for irrigation use, it may be appropriate to encourage the use of sewage effluent for irrigation water.
15. Waste Management Strategy. As discussed at an August 1, 1990 meeting at Mountain Pass, Molycorp will be required to formalize a Waste Management Strategy for the entire Molycorp operation. This strategy will prevent and/or control pollution under Section 13261.23 of Porter Cologne. The strategy is planned for incorporation into the operations WDRs.

DH/rpl:molycorp

## DEPARTMENT OF TOXIC SUBSTANCES CONTROL

400 P Street, 4th Floor  
Mail: P.O. Box 806  
Sacramento, CA 95812-0806



February 27, 1992

Ms. Silvia K. Lowrance, Director  
Office of Solid Waste  
Environmental Protection Agency  
401 "M" Street, S.W.  
Washington, D.C. 20640

Dear Ms. Lowrance:

In a letter, dated March 21, 1991, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) requested a determination of the Bevill status of several hazardous waste streams generated by Molycorp, Incorporated (Molycorp) at their Mountain Pass Mining Facility. DTSC received a response letter, dated May 14, 1991, that detailed the U.S. Environmental Protection Agency's (EPA) determination of the Bevill status of Molycorp's hazardous waste streams. In recent conversations with Mr. Bob Hall, of your staff, we were informed that your office is reconsidering the Bevill determination for Molycorp. This proposal is troubling to DTSC.

DTSC has an active enforcement case against Molycorp. The case primarily concerns the facility's lead/iron filter cake, a RCRA hazardous waste. The facility had stockpiled over 8,000 drums of this waste in the hazardous waste storage area since 1984. During a January 16, 1991 inspection, DTSC staff observed almost 300 severely corroded or leaking 55-gallon drums in the hazardous waste storage area.

DTSC took action against Molycorp based on the judgement that the filter cake was generated by mineral processing. This judgement was confirmed by EPA in your May 14, 1991 letter. Because of the enforcement action DTSC took, Molycorp has significantly improved the condition of the hazardous waste storage area and the management of its waste.

Molycorp indicated to our attorney, Gail Feuer, Deputy Attorney General, that old process information was submitted by our Department to EPA, on which your Bevill determination was based. On March 21, 1991, we submitted to your office a recent description of Molycorp's mineral refining process and process

Ref. # 23

Ms. Silvia K. Lowrance, Director  
February 27, 1992  
Page 2

flow diagrams that we adjusted, based on information provided during our January 14, 1991 inspection.

Based on this recent information submitted, there was a strong technical basis for the mineral processing determination that was supported by the following observations:

1. The process that generated the filter cake waste was following a hydrochloric "leaching" that resembles acid digestion (a mineral processing operation),
2. The filter cake waste was not a high volume and low hazard waste (a critical criteria for beneficiation processes),
3. The filter cake waste was not earthen in character,
4. The filter cake waste was not one of the twenty temporarily exempt mineral processing wastes,
5. The filter cake wastes were being managed on-site in the same manner as other hazardous wastes generated at the facility.

EPA's concurrence on DTSC's determination was based on the regulatory guidelines published by EPA on September 1, 1989, in the Federal Register. To reclassify Molycorp's filter cake waste from mineral processing to beneficiation would clearly conflict with those regulatory guidelines.

While DTSC understands that EPA is giving Molycorp the opportunity to state their position on the Bevill Determination of their waste, it is our opinion that EPA's first determination is correct. If you would like to further discuss this issue, please call Paula Rasmussen at (310) 590-5950.

Sincerely,

  
William F. Soo Hoo, Director

cc: Please see next page

Ms. Silvia K. Lowrance, Director  
February  
Page 3

cc: Ms. Gail Ruderman Feuer  
Deputy Attorney General  
Department of Justice  
300 South Spring Street, 5th Floor  
Los Angeles, California 90013

Ms. Bonnie Wolstoncroft  
Department of Toxic Substances Control  
Toxics Legal Office  
P.O. Box 806  
Sacramento, California 95812-0806

bcc: John Scandura, Chief  
Site Mitigation Branch  
Region 4

bcc: Mohinder Sandhu, P.E., Chief  
Facility Permitting Branch  
Region 4

0

bcc: Paula Rasmussen, Chief  
Surveillance and Enforcement Branch  
Region 4